DEC 1 1 1980 Item 1033
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1923

# *Senate Hearings*

*Before the Committee on Appropriations*

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J#67-487

C-293

Rec. 1-13-81 DJ
Prod. 1-14-81 DJ

#7062019

# MX Missile
# Basing Mode

*Fiscal Year* 1981

96th CONGRESS, SECOND SESSION

**SPECIAL HEARING**

**Department of Defense**

# MX MISSILE BASING MODE

## HEARINGS

BEFORE A

SUBCOMMITTEE OF THE
COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE
NINETY-SIXTH CONGRESS
SECOND SESSION

## SPECIAL HEARING

Department of Defense

Printed for the use of the Committee on Appropriations

U.S. GOVERNMENT PRINTING OFFICE
67-487 O WASHINGTON : 1980

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# MX MISSILE BASING MODE

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**TUESDAY, MAY 6, 1980**

U.S. SENATE,
SUBCOMMITTEE ON MILITARY CONSTRUCTION,
COMMITTEE ON APPROPRIATIONS,
*Washington, D.C.*

The subcommittee met at 10 a.m. in room 1114, Everett McKinley Dirksen Senate Office Building, Hon. Walter D. Huddleston (chairman) presiding.

Present: Senators Huddleston, Young, Laxalt, and Garn.

Also present: Senator Hatch.

## CONGRESSIONAL WITNESSES

### SUBCOMMITTEE PROCEDURE

Senator HUDDLESTON. The subcommittee will come to order.

We are today opening 2 days of hearings on the basing mode for the MX missile.

These hearings were called at the request of Senator Laxalt, the ranking minority member of the subcommittee, and of Senator Garn, a member of the Defense Subcommittee and the full Appropriations Committee.

Funding for research and development, as well as procurement, of the MX missile is, of course, the prerogative of the Defense Appropriations Subcommittee. For fiscal 1981 that subcommittee has before it requests totaling $1.5 billion for the MX. These funds would be used to continue fabrication and ground testing on all the major subsystems.

Pending before the Military Construction Appropriations Subcommittee is a fiscal 1981 request of $17.1 million for MX test facilities at Vandenberg Air Force Base, Calif. In addition, some $97 million of the request for planning and design funds is associated with MX basing. Total basing costs are now projected at as much as $20 billion.

In response to the increasing vulnerability of our land-based ICBM's, the President has directed full-scale engineering development of the MX missile, and the horizontal loading dock basing mode has been chosen.

While there is general agreement that the United States must act, and act soon, to meet the growing threat to our Titan and Minuteman missiles and, therefore, to the strategic triad, there are numerous questions regarding the basing of the MX system and its impact on those areas where it would be located.

Our hearings during these 2 days are designed to examine in some detail the basing mode proposal and to compile a record which will help us make an informed judgment on these matters.

I will now turn to my colleagues, Senator Laxalt and Senator Garn, for whatever statements they may care to make. We will then welcome the distinguished Secretary of Defense, the Honorable Harold Brown, who is accompanied by the Under Secretary of Defense for Research and Engineering, the Honorable William Perry.

## STATE OF NEVADA

## STATEMENT OF HON. PAUL LAXALT, U.S. SENATOR FROM NEVADA

### OPENING REMARKS

Senator **LAXALT**. I thank the chairman.

I would like the record to indicate that I am delighted to be here this morning, for what we feel to be extremely important hearings.

I would like to thank the chairman for cooperating as he has in the conduct of these hearings. I would like, also, to thank Senator Garn for his continuing help and assistance throughout the course of this entire matter.

### MASSIVE PUBLIC WORKS PROJECT

How the next generation intercontinental ballistic missile is to be based is of the utmost importance, both for our national security and for those whose lives it will most directly affect.

The MX missile project has been described by the Air Force as the largest public works project in the history of the world. In scope, it dwarfs even such previous contenders as the Great Wall of China, the pyramids of Egypt, or the Grand Coolee Dam.

As I see it, it is precisely because it is such a massive and lengthy project, and because so much of what it entails will have largely irreversible environmental consequences, that we should be sure what we are doing before we embark upon it.

While some would argue that there is no time for further delay, and there is need for haste in view of the seriousness of the Soviet threat, I believe that threat, together with the magnitude of the project before us, leaves no room for mistakes. To perform our duties effectively, we in the Congress must make a careful assessment of the various basing mode alternatives before we commit ourselves to any one of them.

### AIR FORCE STUDIES ON POSSIBLE ALTERNATIVES

The Air Force clearly has done numerous studies of a long list of possible alternatives. Its conclusions are generally supportive of a multiple protective structure system. Others disagree. We are here today to let both sides state their case, to form a record from which we and our colleagues on the Appropriations Committee and elsewhere in the Senate can make our decisions not just on the basis of the $93 million in planning and design money for the current basing mode in the fiscal 1981 military construction appropriation request, but also for the future of the entire system as it affects not only Nevada and Utah but the Nation and the world.

As you can see from a look at the schedule, the hearings will be structured in three parts: This morning we will hear from the administration on the overall importance of a land-based missile system. This afternoon we will hear from the Air Force both on the importance of the new missile in a land-based mode, but equally important on their selection of the Racetrack basing mode. And, finally, tomorrow morning we will hear from outside witnesses who will discuss some of their favorite alternatives.

### IMPACT OF BASING SYSTEM ON NEVADA

Although we are here primarily to discuss the MX basing modes from a national security viewpoint, it is incumbent on me as a representative of one of the States most affected to say a word or two about the impact of this massive system on Nevada.

As currently planned, Nevada would play host to upward of 70 percent of the entire system. As many of my colleagues know, Nevada is among our most sparsely populated States. The influx of a very large number of people into small, sparsely populated, predominantly rural communities will present economic, social, and environmental complications of the first order. Basic needs for schools, police and fire protection, recreation, power and water have all been called into question.

The use of our land and the availability of water have also become hotly contested issues. Will only 25 square miles be fenced off from public access? Will there be enough water both to build and maintain the system and to satisfy existing requirements? What about damage to the desert environment and the lifestyle of the people who live there? Once the system is no longer needed, what happens then?

The Air Force and the Defense Department have made vigorous efforts to assure the local population that such matters will be dealt with satisfactorily. But, quite frankly, they have not succeeded.

When it comes to such vital issues, we westerners are instinctively skeptical. We have been victimized too often by presumably well-meaning officials from other parts of the country with no real awareness of what our needs are or what living in our part of the country is like. Along with other Members of the Nevada and Utah delegations, I will be continuing my efforts to find satisfactory answers to these questions.

Fundamentally, my basic point is that the MX is designed to defend the entire Nation. As such, if we can be certain of its national security need, I am convinced that most Nevadans will be willing to do their part. Nevadans are patriotic people; we already play host to a number of large Federal installations, including the test site and Nellis Air Force Base, and we are not unwilling in principle to accept more.

But my colleagues must realize the extent of the impact of this largest of public works projects on one of our smallest States. Just to cite one example, it has been estimated that the number of construction workers required to build the system would constitute the third largest city in the State.

But if the people of Nevada are being asked to sustain a burden in order to support the defense of the entire Nation, I think it only fair that the rest of the Nation do its part so that the weight of this burden is more equitably apportioned.

### SPECIFIC OBJECTIVES OFFERED BY NEVADA

For this reason, I think we need at a minimum (1) a basing mode occasioning minimal local disruption; (2) dispersal of at least part of the system to the other parts of the country; and (3) impact assistance in sufficient quantities to cushion remaining difficulties.

In the coming weeks and months I intend to pursue actively each of these objectives.

### NATIONAL SECURITY

On the national security side, I am and have always been a supporter of the MX missile. The doubts which I have publicly voiced concerning this basing mode stem both from its impact on my State and from some serious questions that I have as to its practicality for our national defense, not from any misgivings on my part concerning the desirability of a new land-based ICBM.

In my judgment, the Carter administration has been far too cavalier about the magnitude of the danger confronting this Nation in the next decade. That danger is nothing less than a direct threat to our national security posed by an accumulated and growing Soviet military superiority.

That superiority results from a decade of defense investment in all areas which has far outstripped our efforts. In the 1970's Soviet real defense investment has increased by over 4 percent annually, while ours has declined every year until 1975 and has only recently been on the upturn. Over an entire decade, this means they have spent $240 billion more than we have on defense investment. This is a staggering amount, which when translated into hardware has absolutely frightening consequences.

Those consequences are particularly frightening when one considers our ICBM silos. The fourth generation Soviet ICBM's, the SS–16's through 18's, which have been deployed since 1975, are replacing older weapons now at a rate of about 150 launchers per year. They are also in the process of acquiring accuracy, great throw-weight and the ability to accommodate large numbers of MIRV's.

Taken together, this new generation of ICBM's will within the next 3 years give the Soviets the ability to threaten in excess of 90 percent of our Minuteman force while leaving a substantial segment of their own forces in reserve.

The Soviets have now developed an efficient, highly trained, and effective fighting force and have demonstrated in Afghanistan that they are willing to use it. In this highly charged and dangerous atmosphere I simply do not believe that we can sit back and allow the most important of our strategic force to be effectively neutralized through inaction.

So, I personally think that we need a new missile, and we need one quickly.

### RESERVATIONS CONCERNING RACETRACK SYSTEM

I have certain specific reservations about the timeliness, the cost effectiveness, and the operational practicality of the proposed racetrack system. I think the actual attainment of full operational capability will occur a lot later than the Air Force believes.

I think the system will end up being a good deal more expensive than the Air Force believes; and I am fearful that it is vulnerable to possible intelligence or technological breakthroughs because of its prolonged gestation period, which would render the entire system obsolete before it even comes online. I intend to raise all of these concerns at the appropriate time.

But this is the purpose of hearings. Senator Garn and I have numerous questions which we intend to pose to the experts whom we have asked to come up here and testify. Senator Garn speaks quite ably for himself, but as for me, I want very much to find a system which will both meet our pressing security needs and be something with which the people of my State can live.

I am hopeful that after all the testimony is over and the record has been compiled, a package can be arrived at which will meet both of these necessary objectives.

Senator HUDDLESTON. Thank you, Senator Laxalt.

Senator Garn?

## STATE OF UTAH

## STATEMENT OF HON. JAKE GARN, U.S. SENATOR FROM UTAH

### PREPARED STATEMENT

Senator GARN. Thank you, Mr. Chairman.

First of all, Mr. Chairman, I have a long, detailed statement which I do not want to take the time of the witnesses to read, so I would ask unanimous consent that my entire prepared statement be included in the record.

Senator HUDDLESTON. Without objection.

[The statement follows:]

## PREPARED STATEMENT OF HON. JAKE GARN, U.S. SENATOR FROM UTAH

Good Morning and welcome to these Appropriations Subcommittees hearings on the MX missile and basing mode. Secretary Brown and Under Secretary Perry we appreciate the opportunity to question you, as our most senior defense officials, on a weapons system that is of unparalleled importance to our nation, and a weapons system that has the most awesome potential for our two states.

Any of you who had the opportunity to see the special MX presentation on television last week with Bill Moyers, -- and of course, Dr. Perry who participated as a panelist saw it firsthand, can further appreciate the complexity and emotion-charged nature of the MX debate. Now, the people of Utah and Nevada are attempting to grapple with the enormity and complexity of this issue, just as we are. And, in my view the people of my state are willing to make a contribution to the security of this nation -- even if this brings some hardships. Utahns are that kind of people -- patriotic, determined, loyal -- and I am proud of that fact. However, they should not be asked to bear an unreasonable share of the burden of national defense.

Given the traditional sense of civic responsibility and patriotism among Utahns, it has been difficult in Washington for some to grasp the depth of concern that has been raised by many Utahns in the face of an MX missile system deployed in a racetrack basing mode. In fact, some advocates of a strong defense have been surprised at my own criticism of the MX basing mode decision, expecting me, I suppose, to be an unqualified supporter of MX. What is forgotten, however, in the growing debate on this issue is that there are two basic questions: first, does this country need a new, survivable land-based Intercontinental Ballistic Missile, and second, how and where should such a system be based?

I would like to examine these two questions, turning first and briefly to the strategic requirements for MX. I am absolutely convinced that we need the MX missile; I have no doubts about this. By the early 1980s, the Soviet Union will be in a position to launch a successful first strike attack against our land-based ICBMs. This development, which will take place with or without SALT II, will render the United States susceptible to nuclear blackmail in times of crisis. It is not surprising, therefore, that you Secretary Brown, have stated that "the most serious problem" we face today is the need to address the vulnerability of our land-based ICBMs. We must take those steps necessary to preserve the survivability of our strategic nuclear forces -- the foundation of our security in the nuclear age.

How has this situation come to pass? Why has the SALT process not advanced the survivability of our strategic forces? What steps need to be taken to correct this destabilizing development?

Since the 1960s, the United States has operated under the strategic doctrine of MAD, Mutual Assured Destruction. The rationale for this policy was that if both the United States and the Soviet Union were vulnerable to a devastating retaliatory attack from the other, then neither would have any incentive to strike first. Mutual insecurity was, therefore, according to the theory, supposed to provide the basis of national security. To this end, the U.S. structured its nuclear forces in such a way as not to provide a first strike capability against Soviet forces while still retaining a credible second-strike capability. The fundamental problem with this strategy was that the Soviet Union has never adopted the mentality or the policy of Mutual Assured Destruction -- neither their military doctrine nor their weapons development provides any indication that Soviet military strategy is based on the assumptions of assured destruction. While the U.S. has restricted itself primarily to weapons designed to strike Soviet population centers (countervalue targets), the Soviets are now deploying weapons designed to attack our military forces (counterforce targets), thereby eliminating our ability to wage war.

The bottom line is that for Mutual Assured Destruction to have any hope of success, it has to be mutual. The fact of the matter is, however, the strategic balance has shifted to such an extent that MAD is no longer mutual.

The SALT process has not served to lessen the dangerous implications of the Soviets' rejection of MAD. If anything, it has compounded the problem by lulling the American people into a false sense of security while the Soviets proceed to develop a war-fighting and war-winning nuclear force capability.

During the time of SALT I, the Soviets replaced their SS-11 ICBMs with very capable and much more destructive SS-19 ICBMs. They did so despite a unilateral declaration by the United States that such a conversion would be a violation of the terms of the treaty. Now, SALT II, if ratified -- and President Carter has indicated that he will abide by its terms nonetheless, allows the Soviets to deploy 308 SS-18 heavy missiles while the U.S. is prohibited from having any. These 308 heavy missiles will have more destructive power than all of our strategic forces combined. The fact of the matter is, therefore, that had the SALT process to date not been such a monumental failure, U.S. ICBMs would not be so vulnerable today, and we would probably not need to build the MX.

During this same period of the 1960s, and throughout the 1970s, the United States exercised restraint in providing for its legitimate defense needs. We dismantled the only ABM system we had under development -- even though the SALT I treaty entitled us to maintain it. We almost totally neglected civil defense shelter programs and never did prepare evacuation plans worthy of the name. We closed the production line for Minuteman missiles, and froze our total number of ICBMs at the level we had in 1972. We cancelled the B-1 bomber. The Trident submarine program has been delayed. Our cruise missile programs have been hampered in their development and would be severely limited in their usefulness to our allies if the SALT II Protocol were to be ratified and remain in effect beyond 1981.

Finally, this Administration has continually delayed a decision on the full-scale development of MX and its basing mode to the extent that without resort to quick fixes we will be unable to close the "window of vulnerability" which will face us in the early-to-mid-1980s. This delay occured despite congressional pressure put on the Administration to reach a decision. In 1976 and 1977, the Senate Armed Services put report language in the Defense Authorization Bill calling on the Air Force and the Department of Defense to make a decision on the MX and its deployment. Quite frankly, the intent of this language was ignored, and nothing was done.

So, in 1978, I offered an amendment to the Defense Authorization Bill which was adopted by the Senate, and required a final decision by September 30 of 1978. Unfortunately, in the House/Senate conference committee, this statutory directive was weakened by the inclusion of a significant loophole. The Department of Defense was given the option of making a decision by the deadline date or reporting back to the Armed Services Committee each month past the September 30th deadline to explain why a decision had not been made. The outcome of the loophole was, as one might have expected, that each month Chairman Stennis dutifully received a letter from Secretary of Defense Brown explaining the reasons why more time had passed without a decision. This is how the matter was handled until June of 1979, when the decision was made to go ahead with full-scale development of the missile; in September a decision was announced on the basing mode.

Valuable time has been lost. The credibility of our strategic Triad is threatened. It is my firm opinion that we need to preserve our Triad of strategic forces by deploying a new ICBM with a substantial capability to ride out a Soviet first strike and retaliate against Soviet military targets. The strategic Triad which consists of land-based ICBMs, sea-based SLBMs and intercontinental bombers armed with bombs and cruise missiles has significant advantages over a Dyad of forces -- or one that relies on only two elements of our nuclear forces.

The Triad significantly complicates the Soviets' task in targeting our forces and calculating a preemptive assult. A shift on the part of the U.S. towards greater reliance on sea-based deterrent forces would allow the Soviets to direct their attention and investment to developing their anti-submarine warfare (ASW) capabilities. The United States would be making a serious mistake to abandon the flexibility and capability of the Triad.

Deployment of a survivable ICBM, such as the MX, would help the U.S. to redress the shifting strategic nuclear balance of power, and would remove any incentive for the Soviets to launch a first strike surprise attack. Moreover, it would demonstrate U.S. resolve in the competition between ourselves and the Soviets, thus prompting the Soviets to negotiate meaningful arms control. History has shown that you cannot deal effectively with the Soviets from a position of inferiority. If we are ever to bring the Soviets to seriously consider arms reductions we must strengthen our own position. The deployment of MX in a survivable basing mode will give us back some of that strength.

Having said this, it is necessary to turn to the second aspect of the MX issue, that is the basing mode question. Last year the Senate passed by a vote of 87 to 0 the Stevens amendment to the Defense Appropriations Bill which blocked the Air Force from locking us into the proposed racetrack basing mode. This was a conscious effort to articulate a general sense of uneasiness about racetrack, and to promote the examination of alternative basing modes. However, the Administration has persisted in pushing racetrack in Utah and Nevada, causing Senators Hatch, Laxalt and Cannon and myself to write to the President asking him to reassess the basing mode decision in light of changed international circumstances.

I am pleased by reports in the press and by discussions with senior Department of Defense officials that the Department of Defense is now prepared to drop racetrack in favor of smaller shelters on something like a grid road network. This is definitely a step in the right direction -- militarily, economically and socio-economically. In addition, the Defense Department is prepared to abandon the transporter-erector-launcher (TEL) with its independent dash capability -- something which, to my mind, never did make any practical sense to begin with. These are indeed movements in the right direction, but I will not cease my efforts to work within the Congress and with the Administration to refine this system and find the best deployment mode possible.

The fact remains, however, that whether we are talking about racetrack or a grid roadwork system, current Administration plans contemplate putting the entire 200 MX missiles in 4,600 shelters in only two states, Utah and Nevada. There is no getting around the fact that this project will have serious and far-reaching socio-economic, cultural and environmental impacts on the citizens and land of these two states.

The MX deployment, as envisioned by the Administration, will be the biggest "public works project" in the history of the country. You just don't build thousands of miles of road surface, hundreds of huge concrete shelters, and all of the necessary support facilities without having an impact on the environment.

The sudden and extended influx of construction workers and the increased demands for goods and services at unprecedented levels have the potential for creating a "boomtown" economic situation that has to be carefully controlled. Otherwise, when the project is completed, the communities could face a "bust" situation, with severe economic hardships, as the shrunken economy is forced to maintain expanded public facilities for which the supporting revenues have evaporated.

As I talk to the people of Utah, and listen to their concerns, it is clear that they are very worried. Utahns, and I might add Nevadans, will not be taken for granted. There is no reason they should be asked to bear an unreasonable burden. They have every right to demand that their government ease that burden, and minimize any negative impacts on their lifestyles.

I, therefore, consider a comprehensive study of split-basing to be an absolutely essential part of the continuing basing mode reassessment process. I certainly will not accept, nor will Utahns, a half-hearted effort to explore the costs and adequacy of alternative basing areas. Utahns are ready to bear their fair share of the burden on behalf of the nation's defense, but it seems unfair to me to saddle the citizens of Utah and Nevada with the full burden of the entire MX system, whatever basing mode configuration is ultimately adopted, unless the costs or constraints of split-basing are prohibitive; I for one do not believe they are.

Also, in bearing our fair share of the nation's security burden, Utahns must recieve adequate federal impact assistance. The potential impacts of the MX must be carefully weighed against the values and preferences of the people most directly affected -- as only they themselves can describe them. Nothing irritates me more than to have Washington bureaucrats telling states and local communities what they do or do not need in their attempts to grapple with the impacts of this weapon system deployment or any major public works project. State and local officials are the ones that will be faced with the day-to-day decisions on how to cope with the impacts of MX. They are the ones who should determine, to as large an extent as possible, what their needs are and what the best ways are to address those needs.

Consequently, over the last six to eight months, I have spoken with Governor Matheson and other officials and with many citizens of Utah to identify their major concerns about how the deployment of MX would affect the quality of life in Utah. I will state these concerns up-front in these hearings in order to show you what questions will have to be answered, regardless of the basing mode selected or the number of missiles deployed in Utah.

With regard to the socio-economic impacts of MX deployment, much clearer assurances are needed of federal help in planning for mitigation of such impacts and in obtaining funds to carry out such plans. In demand for available labor and resources, the construction and operation of MX has direct and indirect implications, both of which must be figured in with the effects of other large scale programs planned for Utah in the mid-1980s. We need to have forthright, unambiguous commitments that federal assistance would be made available to cover the full range of these impacts. It seems to me that, in the formation of a workable intergovernmental task force to oversee the management of MX impact mitigation, present arrangements need to be rationalized further so that there are clear assignments and unmistakable lines of authority for carrying out the mitigation measures which are decided upon.

Of particular concern in the area of socio-economic impact are the problems associated with providing housing for the huge number of workers, Air Force personnel and their families involved in the construction and operation of the MX system. Past experience with major construction projects demonstrates that far too little advance planning has taken place with housing. It is urgent that the appropriate committees, task forces and officials begin to give attention to ways of getting the housing issue examined now -- not after MX construction has begun. Housing is an especially complex issue because it has serious market-mechanism implications for the private sector -- unlike schools, roads, hospitals, sewer works, water, police, health and garbage services which impact mainly on the public sector. This is not to lessen the importance of considering the public sector impacts, but rather to say that more time and study will be needed to examine the housing issue, and the time to start is now, not later.

With regard to the environmental impact of MX deployment, many of the concerns of Utah citizens would be alleviated if the federal government would assure that it will comply with existing state and federal laws in constructing and operating MX. For example, adherence to Federal Land Policy Management Act (FLPMA) provisions in obtaining public land withdrawals; compliance with Clear Air, Clean Water and Hazardous Waste legislation during construction and operation phases; would ensure protection of the clean environment now existing in the areas designated for potential deployment.

With regard to the impact on water resources of MX deployment, of all natural resources, Utahns are most protective of their water. We have been assured several times in recent months that sufficient water exists to support MX construction and operation phases. However, concern is still very strong that the federal government might bypass state laws and practices in acquiring this water or that groundwater resources will be diverted without full understanding of how that might affect surface water flows. I wish to seek assurances here, for the record, that the Air Force will comply with state water laws and will not seek to assert a federal water right, reserved or unreserved; and that the Air Force mining of underground water for the MX would not be done before studies are completed of the relationship between underground water and surface water flows.

With regard to the energy impact of MX deployment, Utahns are troubled by the realism, or lack of it, in the goal for MX to be energy self-sufficient. We need assurances that MX would not be allowed to put unacceptable pressure on already rising energy prices, and that the impact of the project would be figured in to the petroleum allotment now allocated to the state -- thus preventing the occurence of a supply shortage with its adverse economic implications for the state.

With regard to land-use implications of MX deployment, ranching and minerals industries in Utah need assurance that MX would not further depress their economic prospects during this recessionary-inflationary era. Base-siting must not cut off access to a substantial mineral deposit. Those industries operating existion exploration programs for oil, gas and minerals using seismic methodology need assurances that they can continue. Adjustments in grazing allotments, where necessary, will require fast-track efforts by the Bureau of Land Management (BLM) to make the necessary public lands available. The Air Force must be prepared to pay for supplemental livestock feeding or watering or otherwise provide assitance and work with existing ranchers, rather than buying them out wholesale.

Underlying all these issues is the concern that insufficient time is being given to properly study these potential impacts and to properly plan how to deal with them. There is a limit to how much you can do in a limited amount of time. It is recognized the professional calibre of the people carrying out the baseline studies for the Environmental Impact Statement (EIS)*, and Utah's state representatives approve of the basic work programs that have been adopted thus far. However, all of us are concerned when methodologies for baseline data/monitoring -- which are designed to take a full year, are telescoped into a two or three month period. Such practices could have the serious consequence of resulting in protracted litigation, contesting the validity of a too-hastily completed EIS. Also, we need to know what the Air Force intends to do in the event of law suits that could delay MX. Will fast-track legislation be introduced?

Before closing, I would just like to highlight for you the broad range of challenges the people of Utah are facing in the 1980s as the state continues to grow and develop. At the same time that the MX project will be underway, the large Intermountain Power Project (IPP), is to be built, in a location very close to a portion of the proposed MX deployment area. IPP will be the largest coal-burning power plant in the United States and will employ 3500 workers in construction and about 650 permanently. On top of this, the passage of the Synthetic Fuels bill by the Congress will generate a good deal of exploration and development of tar sands, and Utah contains about 95% of the known tar sands reserves in the United States. Moreover, there are vast amounts of coal in Utah and Nevada that will be a sought after commodity as the price of oil continues to rise or its availability becomes less. Clearly, the impact of all these projects on Utah will be of enormous proportions. It is certainly easy to see why the residents are worried about the socio-economic impacts that they face, and why they must play an integral part in planning for these projects.

The gap therefore, between what the residents of the affected area can tolerate and what the impact of the basing system is projected to be, must be reduced. Once the needed changes are made, and the basing mode decision is made, proper planning and adequate economic assistance must then become the highest priority.

So, let me summarize by saying that I know that you all have testified for many hours on the MX missile and the MX basing mode, and consequently, you may feel that your time could be better spent. But I would argue otherwise. We are at a stage in the legislative decision making process that could make or break the MX for good. Fortunately, I think that the events of recent weeks have been helpful in building a political consensus for MX. The most recent events were the letters that you, Secretary Brown, and Secretary Perry sent to several Senators, which spelled out certain design refinements that you were planning to propose or consider for the MX basing mode. I want this hearing to be another event that is favorable to sound decision making on the MX missile and its potential basing mode. We want hard evidence that other alternatives to the MX are not better. We want to hear clear and convincing assurances about mitigating the socio-economic impacts on the states of Utah and Nevada. We want to examine the current status of MX missile development and proposed basing mode design. Regarding the basing mode, we will wish to examine: the recent transporter-erector-launcher design refinement; the cost effectiveness of the horizontal loading dock and vertical shelter types; the road network plan -- racetrack, grid, or section; and the costs, problems, and impacts of split deployment.

Thank you, Mr. Chairman.

### INTRODUCTION OF ASSOCIATES

Senator Garn. I would like to recognize the fact that Senator Young from North Dakota, who is the distinguished ranking minority member of the entire Appropriations Committee, just came in. I would also like to recognize my junior colleague from Utah, Senator Hatch; although he is not a member of the Appropriations Committee or these subcommittees, he certainly has just as much interest in the effect of MX on our State as I do, and has worked with me very closely in these matters, so I am pleased to have him here today.

Let me just summarize with a few comments, Mr. Chairman.

### SUPPORT FOR MX

I think both Dr. Perry and Dr. Brown and I have had a long association together over the last 3 years on many issues, primarily as a result of my service on the Armed Services Committee; so they know as well as anybody, if not better, that I have been an absolute supporter of the development of the MX missile.

As a matter of fact, our first encounters on MX were efforts by myself to try to speed up the decision on MX. In 1970 and 1977 there was language in the authorization bill from Armed Services encouraging an early decision by the administration to proceed with MX. When we felt that we had been ignored, and that the decision was not proceeding rapidly enough, I authored an amendment in the authorization bill for fiscal year 1979 that required the Defense Department to make a decision on whether or not to go ahead with MX by September 30 of 1978.

That was passed by the committee and by the full Senate. Unfortunately, when it went to conference with the House of Representatives, the House did place a loophole in it that said that Secretary Brown could report to us every 30 days why they had not made a decision.

Secretary Brown certainly complied with that provision of the law, and every 30 days told us why they had not made a decision. I only bring this up, Mr. Secretary, to emphasize the fact that I am not an enemy of the MX missile. As a matter of fact, I felt so strongly about the vulnerability of our land-based ICBM force, and that we are now all agreed on—this is the so-called window of vulnerability or bathtub or whatever we want to call it—that I tried very hard to have a decision made at least 2 years earlier than it was.

### MAIN ISSUES SURROUNDING MX

There are two issues: One is the need for the MX, and I think that need is unquestioned. Everyone is entitled to their own opinion; they are entitled to their own facts. The facts of the strategic nuclear disparity between ourselves and the Soviet Union are very worrisome to me.

I think the case has been made that we must have a follow-on missile.

The second issue, however, is the basing mode question: How do we base it? What is the most militarily and cost-effective way to base the missile? And that is where we have some disagreement.

I am one who very early questioned the feasibility of the so-called racetrack or closed-loop system, referred to it as a "Rube Goldberg" system, particularly the automatic dash and many other aspects of it, a long time prior to any decision that was made to base it in Utah or Nevada.

In December of 1979 the Stevens amendment was passed, 87 to zero. This was a conscious effort by the Senate to say that we want consideration of other basing alternatives; we do not want the Department of Defense to go blindly ahead with Racetrack, because I think there was a general uneasiness in the Congress about Racetrack, and we wanted to promote the examination of alternative basing modes.

### ADMINISTRATION SUPPORT OF RACETRACK

However, the administration continued to persist in pushing racetrack in Utah and Nevada, which caused Senators Hatch, Laxalt, Cannon, and myself to write to the President to ask him to reassess the basing mode decision in light of changed international circumstances.

I am pleased to report in the last few weeks I have very much appreciated the cooperation, particularly of Dr. Perry, working in your behalf, Dr. Brown, and members of the Air Force, in trying to resolve some of these differences.

I was particularly appreciative of your letter of last week, announcing that you have made refinements in the MX design, such that the original TEL and the automatic dash will be eliminated. I certainly think that is a step in the right direction.

### CORRESPONDENCE

I am also pleased with a letter that I received just this morning from Dr. Perry, and I would like to read this into the record:

> DEAR SENATOR GARN: Thank you for your comments on our MX design refinement. The suggestion you make to abandon the closed loop or Racetrack road network is an item we are carefully evaluating. In transport design, which Dr. Brown has approved, there is no special advantage to the closed road layout. It appears that the linear road network will be more efficient. The exact layout of the road net will be designed to conform to the topography of each valley, with the objective of minimizing impact and cost.
>
> I will keep you informed as the design evolves.

### RACETRACK BASING NO LONGER FACTOR

This letter indicates to me—although it has not been specifically said—that racetrack is dead. I assume that that is a fair statement this point, because of the conversations I have had with both of you on the linear or grid network system, and the other changes you have made in the design of the TEL, or transporter-erector-launcher.

I think it is fair to announce at this time that racetrack as originally proposed is no longer a viable alternative, and we are proceeding with the design of a linear or grid network system, which I do think is certainly a step in the right direction. But I will not cease my efforts to work within the Congress and the administration to refine the system and find the best deployment mode possible.

Now, despite the fact that I am pleased with what you have do so far, the fact remains that whether or not we are talking abo racetrack or grid or linear roadwork systems, current administrati plans still contemplate putting the entire 200 MX missiles, and t 4,600 shelters, in only two States, Utah and Nevada.

### PROJECT EFFECT ON UTAH AND NEVADA

There is no getting around the fact that this project will have serio and far-reaching socioeconomic, cultural and environmental impac on everyone in those two States.

Now, I feel very strongly—and you, Dr. Perry, certainly have ha the opportunity to be in our States—and I think you are developin a good feel for the attitudes within Utah and Nevada and the problen that we face—all the environmental impact studies in the world, all t facts and figures about water and land use statistics, do not reall address the major problem that we face; that is, the intangible chang in lifestyle in relatively unpopulated rural areas brought on by project of this size.

There is no way that sociologists, environmentalists or anyone ca measure the type of thing that I am talking about. That is what w are most concerned about in our States, that particular change. Th is not an antimilitary feeling in our States at all. In fact, most of th people we are talking about are very strong on national defense an have always been supportive; but at the same time they are concerne about these intangible things that cannot be measured.

I am not sure that a majority of the people in the administratio have that sensitivity that you seem to be developing on this particula issue. I think it is important that we do look at their impacts befor we go ahead.

### SPLIT BASING PROPOSAL

So, in closing my opening remarks, the point I want to make ver strongly is that I consider a comprehensive, sincere study of spli basing to be an absolutely essential part of the continuing basing mod reassessment process. I certainly will not accept, nor will Utahans, halfhearted effort to explore the cost and adequacy of alternativ basing areas.

That is the purpose of these hearings that Senator Laxalt and I hav called, to explore those alternatives and to come up with the bes possible military and cost-effective way to base a missile that we deem necessary in the security interests of this country—a way that minimizes the socioeconomic and environmental impacts on our States.

I certainly echo what Senator Laxalt has said. We are willing to bear our fair share of this project. We are not willing to bear mor than our fair share.

### COAL-FIRED POWERPLANT

The final point I would make is that even if this were not a military project, if it were a string of large powerplants or other types of impacts, we would be asking the same questions. I want to make that very clear. It is not an anti-MX or antimilitary feeling. In our State we may have some additional problems that Nevada does not have, that is, the building of a very large—as a matter of fact the largest—coal-fired powerplant in the United States near the area being considered for MX deployment.

Additionally, we have 95 percent of the tar sand reserves of the entire country, also oil shale and other energy-related developments are going to occur in our State very rapidly. So, we are facing tremendous economic growth unparalleled in the history of our State.

Thank you very much.

Senator Huddleston. Thank you, Senator Garn.

Senator Young, who is a member of the subcommittee, is here.

Senator Young, do you have a comment at this time?

Senator Young. No comment, except I feel strongly we have to deploy the MX missile. If we don't, Russia undoubtedly will have superior ICBM capability compared to the United States.

I realize deployment is a difficult problem. I hope somehow we can work out a satisfactory arrangement.

Senator Huddleston. Thank you.

Senator Hatch, we are glad to have you join the subcommittee. We will be glad to have any comments you wish to make.

## State of Utah

## STATEMENT OF HON. ORRIN G. HATCH, U.S. SENATOR FROM UTAH

### FACTORS IMPACTING ON UTAH AND NEVADA

Senator Hatch. Thank you, Mr. Chairman.

I am happy to be here with you also. Certainly, I am happy that Senator Laxalt and Senator Garn invited me, as well as yourself. I think both Senator Laxalt and Senator Garn have covered the matter very well.

As I have gone through the MX country in Utah—and I have been in some of the areas in Nevada as well in the past—basically, there are five things that they are concerned about, which we hope we will discuss today:

No. 1 is the effectiveness of the MX missile and the need for it.

No. 2 is the impact on our national security. Is it essential to the national security interests of this country?

No. 3, what are the impacts on society, highways, jails, fire stations, hospitals, housing, courts, schools, et cetera?

No. 4, one particular impact on society that could be put into a special category of its own: What will be the impact on land resources, both environmental and from a productive use standpoint, and what really is the effect of basing modes?

Now, there are other questions, but these seem to be the basic questions asked by my constituents as I have gone around Utah talking to people about them.

### STATE SUPPORT FOR MX PROJECT

All I can say is that you have an excellent chance of having approval of the MX missile in Utah, at least if you can answer those problems, and do it in a satisfactory manner.

When I traveled through Utah, I found if I asked, "How many of you are for the MX missile?" 60 or 70 percent would say yes. If I asked how many thought the MX missile is essential, 95 percent put up their hands. If I asked how many would be for the MX missile if it were essential to our national security and also consideration would be given to the impacts on our society in Utah, virtually 100 percent put up their hands.

There were occasionally some who would not.

These are issues that both Senator Garn and Senator Laxalt have raised very well.

I just appreciate this opportunity to be here, Mr. Chairman, with my two western colleagues, and will certainly listen as much as I can, and read everything that I can possibly read concerning it.

Thank you very much.

Senator HUDDLESTON. Thank you, Senator.

# DEPARTMENT OF DEFENSE

## SECRETARY OF DEFENSE

## STATEMENT OF HON. HAROLD BROWN, SECRETARY OF DEFENSE

### IMPORTANCE OF MX TO NATIONAL SECURITY

Senator **HUDDLESTON**. Secretary Brown, you may proceed.

Secretary **BROWN**. Mr. Chairman and members of the subcommittee, rather than read my statement, which I would like to put in the record, I think it would be better if I hit a few highlights and then took the rest of my time to try to answer some of your questions. I would like to touch on three points which are related to the various points which members of the committee and others have made.

First, I want to deal with the importance of the MX to the national security; second, what we are doing about considering and minimizing the environmental impact of the system; and third, something about the cost of the development and deployment of the MX. Secretary Perry will then talk in more detail about the system and will focus on recent design improvements that, I think, will have the effect of both lowering the projected cost and reducing the land requirements. After that, Secretary Chayes and others in the Air Force are prepared to go in depth into those additional issues that some of the members of the subcommittee have indicated are a concern.

### MX NECESSARY TO MAINTENANCE OF TRIAD

Briefly, we need the MX in order to maintain the strategic Triad. Lots of questions have been raised about why we need a Triad, why we can't do with just one or, at most, two different systems. What difference does it make, it is asked, if our land-based missiles become completely vulnerable? Although each of you here has expressed a strong support for a continued land-based missile system, that support is not universal in the Congress or in the country.

What concerns me is that the view that one does not need a land-based MX missile system, combined with environmental concerns—local concerns which certainly have a legitimate reason for being raised—will together prevent us from doing what needs to be done in the interest of national security.

### SURVIVABILITY OF LAND-BASED FORCE

Let me turn to the question of survivability of the land-based force. It is clear, and I think I have, myself, asserted ever since 1977, that we are approaching and, I think, are now very close to the time when the Soviets can strike our land-based ICBM's with at least two reentry vehicles on each silo and reduce their surviving numbers to a very small percentage of the original Minuteman-Titan force and still have many thousands of warheads left over, themselves.

Some have said that is acceptable, that we need not restore survivability of our ICBM force and, instead, depend on a dyad force, our submarine-launched ballistic missiles, and air-breathing bombers with cruise missiles. That is a mistake, I believe. First, abandoning the ICBM force in the face of an increased Soviet threat to us would concede an important perceptual advantage to them and give a misleading dangerous signal.

Even more important, the resulting dyad of forces would concede an additional advantage to the Soviets by allowing them to concentrate on the remaining two components as they consider or pursue a disarming first strike, war fighting or damage limiting capability. The point can be argued whether they have such a doctrine. In fact, we need to be concerned that they may.

## UNIQUE CHARACTERISTICS OF TRIAD

Each leg of the Triad that now exists has unique characteristics in terms of military offensive capability and has differences with respect to what sort of enemy attack it might be vulnerable to. The lack of a common vulnerability presents an attacker with a virtually impossible targeting problem if he tries to disable all of our strategic forces at the same time, thus avoiding retaliation.

That is what has been behind the Triad from the beginning, and indeed that idea has been borne out. The Triad has and will continue to hedge against two plausible and serious risks. First, a technical problem may develop that temporarily disables one of the legs of the Triad. That happens infrequently, but it has happened and it has happened only temporarily. The other two legs then continue to provide an adequate level of deterrence, adequate temporarily while the problem is being corrected.

A similar thing can occur over a longer time when a technological breakthrough or rapid evolution in the threat reduces the survivability of one of the Triad legs. In both cases, having the Triad mix of systems gives us the time to address the vulnerability rationally and in an acceptable way.

## MINUTEMAN FORCE

We happen to be in this latter situation—that is, a technological change and a change in the threat with respect to the Minuteman force. The Minuteman will become vulnerable in the earlier years of this decade, but the other two legs of the Triad, the SLBM's and the air-breathing force, will continue to give us high confidence in the capability of our strategic deterrent forces until we can restore the survivability of our ICBM force.

Suppose we don't correct that ICBM deficiency, that we don't deploy a land-based system. Then the Soviets can concentrate their efforts on going after our air-breathing forces and our SLBM's. That increases the risk of a future technological surprise and it could lead to a very dangerous gap in deterrence, not just in the loss of confidence in one system but all of the systems.

### INVULNERABILITY OF SLBM'S

It has been said: Why bother? The SLBM's are invulnerable and they will stay that way. My own judgment is that during the 1980's our submarine-launched missiles will be invulnerable.

Antisubmarine warfare breakthroughs are not in prospect in terms of deployed forces, whatever ideas people may come up with, during the 1980's. But during the 1990's I can't give you that assurance. I am not saying that there will be an ASW breakthrough during that period; I am saying just that that is far enough away so that we can't say that there won't be.

It will take most of the decade of the 1980's to build up the land-based ICBM's so that we would then be in a position to be able to withstand a technological breakthrough in deployed antisubmarine warfare forces on the part of the Soviet Union.

This is what is behind the MX. We have been looking, for over a decade, at various ways of extending the survivability of land-based ICBM's and we have looked at numerous proposals and rejected many of them. Some lack the right military characteristics; some cost too much; some are not technically feasible. It is that examination that may have led to some disagreements between me and some of you in the past about whether we were ready with the system.

### MULTIPLE PROTECTIVE STRUCTURES

We have concluded that the multiple protective structures stand out as the only concept which has the necessary force characteristics in terms of survivability and effectiveness but can be built at a reasonable cost. It does that by confronting the Soviets with an adverse exchange ratio. They would have to use more of their force than the portion of ours they could expect to destroy with that part of their force.

That, it seems to me, deters a rational enemy from a preemptive attack. An attack that ends up with a less favorable military position is hard to justify in terms of military argument. I continue to believe that that MPS mode is the most survivable and effective basing option.

Dr. Perry will discuss in more detail that system, including some recent refinements to which you have referred, Senator Garn, that will result in operational benefits, lower costs, and will reduce the environmental impact. We have learned that we can replace special and expensive railroad tracks leading from the assembly area in that design to a deployment area with a much lower cost roadway, still preserving necessary verification.

We can replace the transporter-erector-launcher with a smaller detachable erector-launcher that would be moved when necessary by separate transport. That reduces what you have to put in the shelter and it makes the shelter smaller and reduces the environmental impact. It also reduces the cost.

It reduces the land-use requirements and will cause the simulator, which is needed to prevent an adversary from finding out whether a launcher is present or not in one of the shelters, to be simpler and less expensive since we need to simulate a smaller package. Bill Perry will go into this in more detail.

## PUBLIC CONCERN AND ENVIRONMENTAL IMPACT

Let me go now into the crucial areas of public concern and environmental impact which will be developed more fully in later testimony in this hearing by the Air Force.

I want to assure you that we in the Defense Department all place a high importance on this aspect of MX deployment. We have tried to be sensitive to the concerns of affected citizens as we prepare the third environmental impact statement, this time supporting the deployment area selection decisions.

There has been a long series of meetings to solicit the views of various agencies at all levels of government, congressional delegations, Governors and the public. I understand there have been over a dozen meetings involving over 6,000 citizens, and the issues they raised include quality of life, water, mining, grazing, the boom-bust problem, and Federal assistance, all of which have been mentioned by one or more of you today.

Two weeks ago, Dr. Perry, Secretary Chayes, and the Deputy Assistant to the President for National Security Affairs, Mr. Aaron, went to Salt Lake City and participated in a nationally televised panel discussion on MX. They also visited with local government officials, church leaders, and other interested individuals particularly affected by MX basing in that area.

We intend to continue with that kind of interaction with the public.

As we have evaluated public concerns, we have changed some of the aspects of the MX basing concept. We have gone to point versus area security, limiting the amount of fenced land to 25 square nautical miles, and will allow public and grazing access rights up to the fences around each shelter. Even the fencing design came from an input by the Cattlemen's Association. Mining interests will not be disturbed under our policy, which is to avoid valleys of proven mineral deposits as determined by mineral surveys to be done before site selection.

## WATER CONSUMPTION PROBLEMS

The availability and consumption of water is a problem which has gotten considerable attention. It seems to us so far that the problem may be less serious than many have thought. One statistic that has been given to me is that the steady state annual requirement for water for the MX system is about equal to the total consumed at 12 golf courses in the greater Las Vegas area, which is one of the least rural, developed parts of the area, or about 13,000 acre-feet per year.

According to State officials, I understand that is less than 5 percent of the water available from precipitation alone in the areas of interest in Nevada and Utah. There are ground sources that could make more water available. We are taking surveys in about 30 candidate valleys, looking for untapped aquifers.

We are also looking, as an example of our response to public concerns, at the amount of economic assistance needed to ease the impact on neighboring communities.

### COST OF MX SYSTEM

Let me go briefly to the issue of cost which, because this is a big program, needs to be set in perspective, not only with the pyramids and the Great Wall but also with other large weapon systems.

In constant dollar terms, it is actually less than any one of the original three legs of our strategic Triad. The Minuteman system cost more in constant dollars than we project this system will cost. The B-52's cost more, and the Polaris and Poseidon cost more. We have made careful estimates of man-hours and materials needed to develop, produce, and install the system. We calculate that if they were all done today, the 1980 dollar cost for MX would be $33 billion, and the minimum cost of the other programs in 1980 dollars is $40 billion.

Let me summarize: MX is designed to meet a real and serious threat being posed by the Soviets. It will do so with high confidence. We will minimize the intrusiveness on the environment and the public and we will continue to work with you and with local people to see that that is done. We intend to continue hearing from those in the affected regions and to work on the technical details, so as to minimize the effects. It will be about as costly in constant dollars, and maybe somewhat less, as previous strategic systems developed for the same purpose, and the purpose is to maintain an unambiguously strong and secure strategic deterrent.

### PREPARED STATEMENT

Thank you, Mr. Chairman. I ask that my prepared statement be inserted in the record.

Senator HUDDLESTON. Without objection.

[The statement follows:]

## PREPARED STATEMENT OF HON. HAROLD BROWN
## SECRETARY OF DEFENSE

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

I AM PLEASED TO TESTIFY IN SUPPORT OF THE MILITARY CONSTRUCTION PROGRAM FOR MX. IN MY REMARKS I WILL BRIEFLY ADDRESS THREE POINTS: FIRST, THE IMPORTANCE OF MX TO THE SECURITY OF OUR NATION; SECOND, OUR CONSIDERATION OF THE ENVIRONMENTAL IMPACT OF THE SYSTEM; AND THIRD, THE COST OF DEVELOPING AND DEPLOYING MX. SECRETARY PERRY WILL THEN DESCRIBE THE SYSTEM, FOCUSING ON RECENT DESIGN IMPROVEMENTS WHICH WILL SOMEWHAT LOWER COSTS AND REDUCE LAND REQUIREMENTS. SECRETARY CHAYES PLUS OTHERS FROM THE AIR FORCE ARE PREPARED TO EXPLAIN IN DEPTH THOSE ADDITIONAL ISSUES OF PARTICULAR CONCERN TO THIS SUBCOMMITTEE.

### THE NEED FOR MX: MAINTAINING THE STRATEGIC TRIAD

THE MOST DISTURBING FEATURE OF THE CONTINUING SOVIET STRATEGIC BUILDUP IS THAT OUR MINUTEMAN ICBM FORCE, BASED IN HARDENED SILOS, WILL SOON LOSE ITS ABILITY TO SURVIVE A NUCLEAR ATTACK. THIS DANGER IS A RESULT OF THE IMPROVED ACCURACY OF SOVIET FOURTH GENERATION ICBMS. THE REENTRY VEHICLES ON THESE MISSILES WILL BE ACCURATE ENOUGH TO PLACE ANY FIXED TARGET AT RISK, AND THEY WILL BE DEPLOYED IN LARGE ENOUGH NUMBERS TO PERMIT THE TARGETING OF TWO WARHEADS AGAINST EACH MINUTEMAN SILO, WITH A RESIDUAL FORCE OF MORE THAN 4,000 REENTRY VEHICLES FOR USE AGAINST OTHER TARGETS.

HOW DO WE RESPOND TO THIS REDUCED SURVIVABILITY OF ONE LEG OF OUR STRATEGIC TRIAD? SOME HAVE ARGUED THAT WE SHOULD FOREGO RESTORING THE SURVIVABILITY OF OUR ICBM FORCE AND INCREASE OUR DEPENDENCE ON THE REMAINING DYAD OF FORCES, CONSISTING OF SUBMARINE-LAUNCHED BALLISTIC MISSILES (SLBMS)

AND THE AIR-BREATHING BOMBER/CRUISE MISSILE FORCE. I BELIEVE THIS IS THE WRONG APPROACH FOR TWO REASONS:

(1) ABANDONING OUR ICBM FORCE WOULD CONCEDE AN IMPORTANT PERCEPTUAL ADVANTAGE TO THE SOVIETS, A DANGEROUSLY MISLEADING SIGNAL, AND

(2) THE RESULTING DYAD OF FORCES WOULD CONCEDE AN EVEN MORE IMPORTANT MILITARY ADVANTAGE TO THE SOVIETS BY EASING THE PROBLEMS THEY FACE AS THEY CONSIDER OR PURSUE A DISARMING FIRST-STRIKE, WAR-FIGHTING, OR DAMAGE-LIMITING CAPABILITY.

EACH LEG OF THE PRESENT STRATEGIC TRIAD HAS UNIQUE CHARACTERISTICS, IN TERMS OF MILITARY OFFENSIVE CAPABILITY AS WELL AS VULNERABILITY TO VARIOUS TYPES OF ATTACK. THE LACK OF A COMMON VULNERABILITY PRESENTS AN ATTACKER WITH A VIRTUALLY IMPOSSIBLE TARGETING PROBLEM IF HE ATTEMPTS TO DISABLE ALL OF OUR STRATEGIC FORCES AND THUS AVOID RETALIATION. HENCE, THE TRIAD PROVIDES A COMPLEMENTARY MIX OF SYSTEMS DESIGNED TO ASSURE DETERRENCE.

THE TRIAD HAS SERVED US WELL FOR TWO DECADES BECAUSE IT HAS PROVIDED, AND WILL CONTINUE TO PROVIDE, THE NEEDED HEDGE AGAINST TWO PLAUSIBLE (AND SERIOUS) RISKS. THE FIRST IS THE DEVELOPMENT OF TECHNICAL PROBLEMS THAT CAN TEMPORARILY DISABLE ONE OF THE TRIAD LEGS. SUCH PROBLEMS HAVE OCCURRED ONLY INFREQUENTLY, BUT WHEN THEY DID, THE EXISTENCE OF THE OTHER TWO LEGS CONTINUED TO PROVIDE A LEVEL OF DETERRENCE TEMPORARILY ADEQUATE WHILE THE PROBLEM WAS BEING CORRECTED. THE SECOND RISK CAN OCCUR OVER A LONGER TIME PERIOD, WHEN A TECHNOLOGICAL BREAKTHROUGH OR RAPID EVOLUTION IN THE THREAT ERODES THE SURVIVABILITY OF ONE OF THE TRIAD LEGS. THE RESULT IS THE

SAME IN BOTH CASES OF POTENTIAL RISK--HAVING THE TRIAD MIX OF SYSTEMS PROVIDES THE NECESSARY TIME TO REDRESS THE VULNERABILITY IN A RATIONAL MANNER.

WE ARE PRECISELY IN THIS LATTER POSITION NOW WITH OUR PRESENT MINUTEMAN FORCE. EVEN THOUGH MINUTEMAN WILL BECOME VULNERABLE IN THE EARLY 1980S, THE TRIAD PERMITS CONTINUED HIGH CONFIDENCE IN THE CAPABILITY OF OUR STRATEGIC DETERRENT FORCES, ALLOWING US TIME TO RESTORE THE SURVIVABILITY OF OUR ICBM FORCE IN A RATIONAL MANNER. IF WE DO NOT CORRECT THE ICBM DEFICIENCY, THE SOVIETS CAN CONCENTRATE THEIR EFFORTS TO NEGATE OUR SLBM AND AIR-BREATHING FORCES MORE EASILY AND SOONER, THEREBY INCREASING THE RISK OF TECHNOLOGICAL SURPRISE AND LEADING TO A POSSIBLY DANGEROUS GAP IN DETERRENCE.

IT IS WITH THIS BACKGROUND THAT WE HAVE TACKLED THE PROBLEM OF HOW BEST TO RETAIN A VIABLE, SURVIVABLE ICBM FORCE. FOR ABOUT 15 YEARS, WE HAVE STUDIED VARIOUS CONCEPTS FOR EXTENDING THE SURVIVABILITY OF LAND-BASED ICBMS; DETAILED STUDIES HAVE BEEN CONDUCTED ON A RATHER EXHAUSTIVE LIST OF BASING CONCEPTS. NUMEROUS PROPOSALS WERE EXAMINED AND REJECTED--SOME BECAUSE THEY LACKED THE DESIRED MILITARY CHARACTERISTICS, SOME BECAUSE THEY WERE EXCESSIVELY COSTLY, AND SOME BECAUSE THEY WERE TECHNICALLY INFEASIBLE.

THE CONCEPT OF MULTIPLE PROTECTIVE STRUCTURES (MPS) STOOD OUT AS THE ONLY CONCEPT WHICH HAS THE NECESSARY FORCE CHARACTERISTICS, YET CAN BE BUILT AT A REASONABLE COST. THE FUNDAMENTAL GOAL OF MPS IS TO DETER AN ATTACK BY CONFRONTING THE SOVIETS WITH AN ADVERSE EXCHANGE RATIO: THEY WOULD ALWAYS HAVE TO USE MORE OF THEIR FORCE THAN THE PORTION OF OURS THEY COULD EXPECT TO DESTROY. THUS, A RATIONAL ENEMY, IF STARTING FROM A POSITION OF NEAR PARITY, WOULD BE DETERRED FROM ATTACKING PRE-EMPTIVELY SINCE ONE RESULT OF SUCH AN ATTACK WOULD BE TO SHIFT THE RELATIVE BALANCE AGAINST HIM.

I remain persuaded that the MPS mode is the most survivable and effective MX basing option among the dozens conceived and studied. Dr. Perry, Under Secretary for Research and Engineering, will discuss in greater detail the MPS basing mode, including recent refinements that I have approved. These refinements will result in operational benefits, lower costs, and reduced environmental impact. Through engineering analyses, we have learned we can replace the special and expensive railroad leading from the missile assembly area to the deployment area with a much lower cost roadway--while still preserving all verification features. Moreover, we have determined that the transporter-erector-launcher (TEL) can be replaced by a smaller, detachable erector-launcher that would be moved, when necessary, by a separate transporter. With this refinement, only the erector-launcher--in contrast to the entire TEL--need be placed in the shelter. Three major benefits derive from this approach:

- The shelter can be made smaller, thereby reducing its cost.
- Using a detachable erector-launcher leads to greater freedom in the basing layout, which reduces land-use requirements.
- The simulator--needed to create the impression that a launcher is present when it is not--will be much simpler and less expensive since we need to simulate only the smaller erector-launcher, instead of a complete TEL.

Dr. Perry will cover in more detail the operational benefits of this refined baseline design.

## Public and Environmental Impact

Now I would like to turn to the crucial areas of public concerns and environmental impacts. The Air Force will develop this subject more fully. I simply want to assure you of the high importance we all place on this aspect of MX deployment.

Our approach has been one of high sensitivity to the concerns of affected citizens as we prepare the third Environmental Impact Statement for this program--this time in support of the deployment area selection decision. A series of meetings has been held to solicit the relevant views of federal, state, and local agencies, Congressional delegations, Governors, and the public. Over 6,000 citizens have attended 12 meetings in the Nevada/Utah areas. The issues that were raised include quality of life, water, grazing, mining, boom-bust, and federal assistance.

Two weeks ago, Dr. Perry, David Aaron (the Deputy Assistant to the President for National Security Affairs) and Secretary Chayes traveled to Salt Lake City, where they participated in a nationally televised panel discussion on MX. This occasion was also used to visit with local government officials, church leaders, and interested individuals who would be particularly affected by the basing of MX in that area. Such meetings are crucial to our ability to understand and address public concerns.

Aspects of the MX basing concept have been modified as we have evaluated public concerns. For example, MX will use point versus area security, thus limiting the amount of fenced land to only 25 square nautical miles and allowing public and grazing access rights up to the fencing around each shelter. Even the fence design resulted from an input by the Cattleman's Association. Mining interests will not be disturbed under our policy to avoid

VALLEYS WITH PROVEN MINERAL DEPOSITS, AS DETERMINED IN PART BY MINERAL SURVEYS TO BE ACCOMPLISHED PRIOR TO SITE SELECTION.

RATHER INTENSE CONCERNS HAVE FOCUSED ON THE AVAILABILITY AND CONSUMPTION OF WATER, BUT SO FAR THIS PROBLEM IS TURNING OUT TO BE LESS SERIOUS THAN MANY THOUGHT. IN FACT, THE STEADY STATE MX ANNUAL REQUIREMENT FOR WATER IS ROUGHLY EQUIVALENT TO THE TOTAL CONSUMED AT 12 GOLF COURSES IN THE GREATER LAS VEGAS AREA, 13,000 ACRE-FEET PER YEAR. THAT TOTAL IS, ACCORDING TO STATE OFFICIALS, LESS THAN 5 PERCENT OF THE WATER AVAILABLE FROM PRECIPITATION ALONE IN THE AREAS OF INTEREST IN NEVADA AND UTAH. GROUND SOURCES SUCH AS UNTAPPED AQUIFERS COULD MAKE MUCH MORE WATER AVAILABLE AND WE ARE CONDUCTING SURVEYS IN APPROXIMATELY 30 CANDIDATE VALLEYS.

AS AN ADDITIONAL EXAMPLE OF OUR RESPONSE TO PUBLIC CONCERNS, THIS ADMINISTRATION IS NOW DETERMINING THE AMOUNT OF ECONOMIC ASSISTANCE NEEDED TO HELP EASE THE IMPACT ON NEIGHBORING COMMUNITIES.

## COST

THE MX SYSTEM WILL NOT BE INEXPENSIVE, BUT THE COST OF THIS SYSTEM IN CONSTANT DOLLAR TERMS WILL BE NO GREATER THAN ANY ONE OF THE ORIGINAL THREE LEGS OF OUR STRATEGIC TRIAD.

WE HAVE MADE CAREFUL ESTIMATES OF THE MANHOURS AND MATERIALS REQUIRED TO DEVELOP, PRODUCE AND INSTALL THIS SYSTEM. IF ALL GOODS AND SERVICES WERE PURCHASED AND DELIVERED TODAY, THE ACQUISITION COST (IN FY 1980 DOLLARS) WOULD BE ROUGHLY $33 BILLION. BY COMPARISON, THE ACQUISITION COST FOR THE MINUTEMAN PROGRAM (EXPRESSED IN FY 1980 DOLLARS) WAS $40 BILLION.

## SUMMARY

IN SUMMARY, THE MX SYSTEM IS DESIGNED TO MEET A REAL AND SERIOUS THREAT BEING POSED BY THE SOVIETS AND IT WILL DO SO

WITH HIGH CONFIDENCE. IT WILL BE MINIMALLY INTRUSIVE ON THE ENVIRONMENT AND THE PUBLIC. WE INTEND TO CONTINUE HEARING FROM THOSE AFFECTED, AND TO WORK ON THE TECHNICAL DETAILS OF DESIGN, CONSTRUCTION, AND OPERATION SO AS TO MINIMIZE THESE EFFECTS. THE SYSTEM WILL BE ABOUT AS COSTLY IN CONSTANT DOLLARS AS PREVIOUS STRATEGIC SYSTEMS DEVELOPED FOR THE SAME PURPOSE--TO MAINTAIN AN UNAMBIGUOUSLY STRONG AND SECURE STRATEGIC DETERRENT.

### CONSTANT CHANGES IN BASING PROPOSALS

Senator **Huddleston**. Thank you, Mr. Secretary.

My colleagues have a greater concern in the location of the basing than I do. I know your time is limited. I just want to ask a couple of questions and then defer to them.

First, Mr. Secretary, during the earlier discussion of the MX there was talk about vertical shelters; then we heard about the dash system. Now we are apparently committed to a loading dock with still some consideration being given to the grid system, or the linear system.

So, the perception, whether it is accurate or not, is that there has been almost continuous changes in the proposed basing mode, and we may not even yet have the final word.

What is your comment on that perception?

Secretary **Brown**. We went very quickly to the idea of mutiple protective shelters. There was a significant difference between the vertical shelters and the horizontal ones. The vertical shelters suffered the defect, which to me is a very serious, indeed a disqualifying one, that it takes a long time to move the missiles from one shelter to another in the case of vertical shelters, so that if the security is compromised, the system is completely compromised.

That is not the case with the horizontal system with which we have been dealing now for more than a year. The changes within the horizontal system—railroad versus roadway, TEL versus a separate erector-launcher, the geometry of racetrack versus a linear system—I think are quite important, understandably so, to the people of the areas involved, because they can affect the environmental impact.

But in terms of the military effect, there is much less difference and there has been much less change. I think the changes that have taken place over the past 9 months to 1 year have been technical refinements in terms of their military effectiveness. They have been more than that with respect to their environmental influence. We would expect to continue these refinements to minimize the environmental impact.

Speed is important. As Senator Garn indicated, it was important enough so that 3 years ago he wanted to proceed very quickly. I believe that we have structured the system so that additional technical changes, which I think are small ones, can be made as we go on, without defraying the system, and at the same time minimizing the environmental impact.

### DETERMINATION OF PRECISE BASING MODE .

Senator **Huddleston**. At what point do you figure that final, precise basing mode has to be determined in order not to delay the projected IOC?

Secretary **Brown**. It depends on what detail you are talking about. I think we need to eliminate the vertical shelter system this year, in fact, within months; otherwise costs will go up and delays will be encountered.

On issues of the precise design of the shelter, for example, I think we have longer. We have perhaps a year. The real concrete-pouring, except for the test system, which is what we are asking for now, will probably begin in 1983. In order to do that, you have to design now.

Bill, do you want to add to that?

Dr. **Perry**. I think that is correct.

Senator **Huddleston**. I think I will defer to Senator Laxalt.

### RACETRACK DEAD

Senator **Laxalt**. Mr. Secretary, are we to deduce from your testimony this morning that racetrack is dead?

Secretary **Brown**. I see no virtue in closing the system at the other end. So I think going to a linear system makes more sense. If you want to say that means racetrack is dead, by all means——

Senator **Laxalt**. Which is important to us, because we gathered in our discussions, principally with Dr. Perry, that if we get away from racetrack, we will have less environmental impact, less ground will be taken.

Secretary **Brown**. That is a very good reason; and that is the decision.

### ADMINISTRATION COMMITMENT TO MX

Senator **Laxalt**. I am interested, Dr. Brown, in the commitment of the Carter administration to MX.

There was a perception here on the Hill, shared by several of us, that MX was on the shelf from 1976 to about 1979, about the time that SALT came on here.

There is an additional perception that if President Carter is reelected, that that will be the end of MX.

Is the Carter administration's commitment to MX such that we can consider that to be a solid commitment?

Secretary **Brown**. We made a thorough review last spring and the administration arrived at a firm decision that we need the MX. The President made his announcement; I guess it was in July. We have not wavered.

Indeed, the reason that we did not go ahead before then was that we were looking at some of the same questions that have since been raised by opponents of the system, questions of vulnerability, questions of basing, questions of environment. We wanted to settle those so that we were firm in our own minds that this was a sensible and necessary system. We reached that conclusion almost a year ago. We have been steadfast. We intend to remain so.

### GAO COST REPORT

Senator **Laxalt**. There was great concern expressed throughout the West and here in Congress over the GAO report which indicated we are looking at $56 billion, rather than $30-plus billion. It is my understanding that the GAO report was directed to 1990 dollars, rather than current dollars; is that the distinction?

Secretary **Brown**. The big difference in the costs that we are quoting and costs that others quote and emphasize has to do with the inflation rate.

If you assume a negative inflation rate, you can get the cost down less than we predict, but I don't expect that to happen. Since none of us really can say what inflation will be during the 1980's, I think the sensible thing to do is to describe it in 1980 dollars, and then say that it will cost in current dollars whatever inflation causes it then to cost.

There have been changes in the constant dollar cost, but there have been as many down as up so far.

### STATUS OF MX WITHOUT SALT CONSTRAINTS

Senator **Laxalt**. There has been quite a bit of speculation that without SALT constraints, the MX could become obsolete. By that I mean the Soviets gearing up to the point they could saturate this system. At that point we would get into a shelter race. Where are we on this very troublesome problem?

Secretary **Brown**. We have made a very careful examination of that, Senator Laxalt. I find it troublesome that people, not including any of those conducting this hearing, who constantly revile the administration for considering the Soviets 10-feet tall, should in this case elect to say that the Soviets are not going to be 10 but 40-feet tall. We don't know what the Soviets have projected for sure in the way of numbers of reentry vehicles that they are going to have.

We do know that this system, the MX system, is amenable to responding to great increases in the Soviet reentry vehicle numbers if they abandon the SALT limitations, which I think would be very unfortunate for them and for us both. Then they can have more warheads and we can have more shelters.

Under those circumstances I think we are in a strategic arms race which will essentially abandon arm controls if the Soviets choose to abandon arms controls. If they do that, we can respond by increasing the number of MX missiles and deployment places. We can respond by increasing the number of shelters in a given deployment, or if they do choose to abandon arms control altogether and go to some very large number of reentry vehicles then, as we have said, we would reconsider the antiballistic missile treaty on the basis that arms control had been abandoned. We could then include an overlay of antiballistic missiles which would minimize the number of additional shelters you would have to build.

### RESPECT OF STATE LAW ON WATER PROBLEM

Senator **Laxalt**. Turning, in conclusion, to some matters of local concern, the Air Force has indicated to our people in both the States of Utah and Nevada that in respect to the vital matter of water, the administration and the Air Force will abide by and respect the State law. Is that the position of the administration?

Secretary **Brown**. That is the administration's position.

Senator **Laxalt**. So we can rely on that?

Secretary **Brown**. Yes. It is a policy decision. We don't consider ourselves legally bound that way, but we have elected to say we will be bound as a matter of policy.

Senator **Laxalt**. That is terribly important to us, obviously, in the West, in terms of our water.

Senator Goldwater made the observation the other day that we are so short of water that the trees are chasing the dogs. I suppose the situation in Utah is comparable.

### PUBLIC USE OF LANDS DEVELOPED FOR MX BASING

Lastly, in terms of multiple use, there are many who feel—and Dr. Perry may discuss this—that in terms of the internal security of this whole system, when you walk about simply fencing off the shelters and permitting multiple use by all the other people, that is so much hogwash, that eventually after the system is in place, we are going to look at a massive fencing project, where thousands and thousands of acres are going to be removed from public use.

How solid is the assurance you can give to the people of Utah and Nevada that, in fact, there will be multiple use in terms of grazing, in terms of recreation and in terms of mining?

Secretary **Brown**. The design has been carefully evolved over a lengthy period to see that we can do that. We intend to preserve multiple use. I think that we are going to have to keep an eye on these areas for security reasons, but I am convinced that we can do that without preventing the other uses that you have talked about.

I think there are lots of limitations on the use of these areas for those purposes. This one will not be a major one.

Senator **Laxalt**. We would like, for our own purposes here, as an absolute guarantee to our constituents, to work on these guarantees within the framework of authorizing or appropriating legislation. We would work with the administration to attain this end so that it is within the four corners of the instrument.

Secretary **Brown**. We will be glad to discuss this with you as the authorization and appropriation legislation proceeds. I don't want to give a blanket commitment without seeing the language.

Senator **Laxalt**. You would not cause us any serious problems in attempting to safeguard our interests in terms of getting it within the four corners of the legislation?

Secretary **Brown**. It depends on the language. Subject to that reservation, we are prepared to cooperate.

Senator **Laxalt**. I thank the Secretary.

Senator **Huddleston**. Senator Garn?

### ADVANTAGES OF TRIAD

Senator **Garn**. Mr. Secretary, I realize you have a problem and have to leave in 3 minutes. I will submit a number of questions to you in writing for your response.

I would like very quickly to agree with you on the need for the Triad. Even if some of the sea-based schemes were proved to be feasible, I am not one who is willing to place all our eggs in one basket.

As a former Navy pilot, who spent 3 years looking for submarines, I know something personally about the difficulty, or lack of difficulty, of finding them. I am not willing to take a chance on a Soviet breakthrough in antisubmarine warfare.

I would feel more comfortable with the Triad. I think it only emphasizes the need for the MX, because of the cancellation of the B–1, which I happened to think we needed to maintain the Triad. I don't think the B–52 is an adequate air-breathing leg of the Triad.

Let me ask you just one question, and the rest of the questions I will submit for the record.

### SPLIT BASING

There is no doubt that the best means of keeping the socioeconomic and environmental impact within bounds is split basing. My question is, just simply, will be get an honest, sincere evaluation of split basing? I raise this issue because there have been rumors, based on internal Defense Department memos, that imply that the Air Force intends to conduct only superficial studies in a half-hearted effort to keep the citizens of Utah and Nevada appeased.

Will we get an honest evaluation of split basing from the Department?

Secretary **Brown**. I want to assure you that we are making a serious investigation and will provide an honest evaluation of split basing. At the same time, I want to tell you in advance that the results may well indicate that split basing may carry a much greater cost. If so, we are unlikely to recommend to the Congress that it go with split basing.

Senator **Garn**. That is what I am pressing for. I don't want an estimate to come back that is inflated in any way. I want a straight, honest comparison, so that Congress has the ability to make that decision as well.

Secretary **Brown**. That is a reasonable request and it will be complied with.

Senator **Garn**. Thank you, Mr. Secretary. I will keep you on time, and submit the rest of my questions for the record.

Secretary **Brown**. Thank you, Senator.

Senator **Huddleston**. I thank the Senator. I am sure there will be other members who will have specific questions of the Secretary. We will, of course, have questions for the other witnesses this afternoon.

I appreciate your attendance.

Secretary **Brown**. Thank you very much, Mr. Chairman and members of the committee.

Senator **Huddleston**. The next witness is Dr. William Perry. I believe you have a statement, Dr. Perry, which you may proceed with.

## UNDERSECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

## STATEMENT OF HON. WILLIAM J. PERRY, UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

### PREPARED STATEMENT

Dr. **PERRY**. Thank you, Senator Huddleston. I have a statement I would like to enter into the record. I would like to highlight a few specific points from that statement.

Senator **HUDDLESTON**. Your statement will be printed in the record at this point and you may summarize it.

[The statement follows:]

# PREPARED STATEMENT OF HON WILLIAM J. PERRY

## UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

Mr. Chairman and Members of the Subcommittee:

Secretary Brown has described the need for the M-X system and our commitment to minimize its impact on the areas where it will be located. I would now like to go into somewhat greater detail on the baseline M-X system as we have defined it, discuss the recent steps we have taken to improve the baseline design and reduce its costs, and then give you my answers to some of the questions which are frequently asked about M-X.

Our studies over a period of several years led us to the conclusion that the best solution to restore the survivability of our ICBM force is to develop a new missile based in multiple protective structures (MPS). The MPS concept relies on a number of hardened shelters for each missile, with the missile moved periodically from one shelter to another in such a way that a potential attacker would not know which shelter contains the missile. He would, therefore, be faced with the propect of targeting most of his warheads at empty shelters, expending more warheads than he could expect to destroy. This is the type of M-X basing system which was approved by the President last September.

Since the beginning of engineering development last September, the M-X Program Office has studied numerous design alternatives during FY 1980, all within the general framework of the Multiple Protective Structures (MPS) concept authorized by the President. MPS design alternatives (Figure 1) included a vertical shelter approach and a horizontal shelter approach, the latter with two different transporter-erector-launcher alternatives.

The conclusion of these studies is that the basic design for M-X should be retained. Our engineering analyses identified technical refinements, however, that would reduce the cost and the complexity of the system, yet retain high levels of survivability, military operational benefits, and verifiability. We intend to incorporate these design improvements immediately.

I will describe briefly the operation of the system as we now envision it after the recent refinements. The missile will be carried in the large vehicle shown in the upper right of Figure 2. This is the same as the Non Integral TEL of Figure 1. This transporter will operate on a road which could be arranged in loop form or could be a straight line, depending on the local topology. Both layouts are indicated schematically in Figure 3. With either layout, the length of road associated with one missile and its transporter will have 23 hardened shelters spaced along its length. To aid in verification, barriers will constrain the missile from leaving its own cluster of shelters.

Survivability of the system is based on two independent modes of operation -- preservation of location uncertainty (PLU) and mobility. PLU is maintained by periodic movement of the missile from one shelter to another and by masking or simulating observables of the movement process. When we carry out this periodic movement, the transporter will back up to the door of each shelter in turn as shown in the upper right of Figure 2. At one of the shelters, the missile and launch canister, indicated at upper left, will roll out of the transporter into the shelter and remain there. At the lower left, the missile and launcher are shown in the shelter after the transporter has departed. Since the missile and launcher cannot be seen inside the transporter, it will be impossible for an observer to know which shelter the missile is in.

While we have high confidence in maintaining PLU, we have backup protection in case concern about PLU should arise. In this case the transporters or some portion of them could go into constant motion so that if tactical warning indicates an attack, those transporters can dash up to shelters and unload their missiles during missile flight times. While we have high confidence in maintaining PLU and consider it the prime mode of survivability, we consider this dash capability an invaluable precaution against future uncertainties.

This particular type of transporter with a separable missile launcher has replaced the Integral Transporter-Erector-Launcher as shown in Figure 1. We believe this change provides several important benefits:

- The shelter can be made smaller (180' long and 15' diameter versus 200' long and 17' diameter), thereby reducing its costs.
- A separate shield vehicle (weighing 585,000 lbs) becomes unnecessary, since the transporter itself can shield the launcher from observation when it is being placed in the shelter.
- The simulator -- needed to create the impression that a launcher is present when it is not -- will be much simpler and less expensive since we need to simulate only the smaller erector-launcher instead of a complete TEL.
- We can now consider linear road layouts, whereas the integral TEL required loop roads to make use of its full dash capability.

In response to the Stevens Amendment to the 1980 Defense Appropriation Act, we are also continuing the test program on the vertical shelters and the vertical shelter transporter-erector. The success we are having with the pre-prototype transporter-erector which was assembled largely from commercial components and is the world's largest rubber-tired vehicle, has confirmed our expectation that development of these transporters would be a straightforward engineering task and not a matter for serious concern; the transporters required for the expected horizontal shelters will be smaller. While we are having the expected success with the vertical shelter test program, I continue to believe that the additional survivability provided by the dash capability with the horizontal shelter approach is well worth the extra cost.

So far I have focused on the basing arrangement. The missile is shown in Figure 4. It is 92 inches in diameter and weighs about 192,000 pounds. It is the largest missile permitted by SALT II and, I might emphasize, is about the largest ICBM which can be survivably based. Engineering development is proceeding at the expected rapid pace. We had a major design review at the end of February. First flight is still scheduled for January 1983, and we plan a total of 20 flights before IOC.

The basic contract structure for the M-X program is now largely in place. Table I shows the principal contractors.

TABLE I

| TASK | CONTRACTOR |
|---|---|
| Assembly Test & System Support | Martin Marietta<br>Denver, CO |
| Launcher | Martin Marietta<br>Denver, CO |
| System Support Equipment | Boeing Aerospace<br>Seattle, WA |
| Command, Control Communications | GTE Sylvania<br>Waltham, MA |
| Reentry System and Integration | AVCO<br>Wilmington, MA |
| Reentry Vehicle | General Electric<br>Philadelphia, PA |
| Guidance Integration and Flight Computer | Rockwell International<br>Autonetics Division<br>Anaheim, CA |
| Advanced Inertial Reference Sphere | Northrop Corporation<br>Fullerton, CA |
| Third Generation Gyro | Northrop Corporation<br>Norwood, MA |
| Accelerometers (SFIR) | Honeywell, Inc.<br>St Petersburg, FL |
| Stage I | Thiokol<br>Brigham City, UT |
| Stage II | Aerojet<br>Sacramento, CA |
| Stage III | Hercules, Inc.<br>Magna, UT |
| Stage IV | Rocketdyne<br>Canoga Park, CA |
| System Engineering and Technical Support | TRW<br>San Bernardino, CA |
| Flight Targeting and Analysis | TRW<br>San Bernardino, CA |

I have discussed the M-X missile system as we are engineering it and the rapid progress we are making in the full-scale development phase. I would now like to discuss some of the elements of this system about which questions have been expressed in the past few months. The President's decision to initiate full-scale development of a new ICBM system was, I believe, greeted with approval by the American public. Nevertheless, there has been a significant amount of public discussion about the way we are implementing that decision. I will review some of the questions which are asked most often and provide my own answers.

Is an MPS system the best solution to the MINUTEMAN survivability problem? The system which is now in full-scale development is the end product of about 15 years of study on the question of what to do if our land-based missiles became vulnerable. The concept of multiple protective structures, which protects the precise location of a missile, stands out as the only concept which fully maintains the national security advantages of a triad of strategic forces, has all the military characteristics we want, and can be built at a cost commensurate with other types of strategic forces. It maintains in full measure the desirable attributes of MINUTEMAN as it was in the 60s to 70s -- survivability characteristics independent of the seaborne and airborne forces, independence of warning, high accuracy, rapid response, secure communications, and low operational costs. Furthermore, the fundamental goal of MPS is to deter an attack by confronting the Soviets with a situation in which they would always have to use substantially more of their force than they could expect to destroy. Thus, a rational enemy, if starting from a position of anywhere near parity, would be deterred from attacking because such an attack would cause the relative balance to shift against him.

Why is the horizontal shelter approach the best type of MPS system? In contrast to the less expensive vertical shelters, horizontal shelters provide an extra level of survivability should we, at some future date, lose confidence in our ability to maintain location uncertainty for the missile. I have high confidence in our ability to preserve location uncertainty. However, since we should expect this system to last well into the 21st century, we would be irresponsible to design it with no fallback position should we lose confidence in our ability to preserve location uncertainty. Vertical shelters provide no fallback. Horizontal shelters do, because of the capability to reconfigure the system rapidly while maintaining location uncertainty, and the capability to move into a shelter within the flight time of an attacking missile. Perhaps these capabilities will never be needed. Perhaps they will be needed for a matter of some months while we fix a problem. But the decision to provide these capabilities must be made now, not later, and I believe they must be provided.

Why is it necessary to locate the system in the Southwestern United States? Over the past several years, we have carefully considered all reasonably possible locations for an M-X MPS system and have balanced all of the complex factors which go into a siting decision. While we have not yet made a final decision, areas of the Southwestern United States, and particularly the desert valley areas of Nevada and Utah, are presently preferred. The first criterion for site selection is that we must have large areas of open land that is reasonably flat. There are technical considerations such as the depth of the water table which affects construction feasibility and the hardness of the shelters. We must consider, and have considered, the current and potential economic productivity of the affected areas. We are examining in great detail the effects of M-X deployment on the local community, on resources such as water and grazing rights, and on other environmental factors such as air quality and archeological sites. We plan to address these impacts not only through direct assistance to the affected areas, but by designing the system from the beginning with features such as point security which will minimize interference with normal public activities in these areas.

Has the system been penalized for the sake of SALT? We have included the following features to support verification:

- Removable viewing ports are provided on the shelter roofs, so that satellite photography could be used to look into the shelters during inspection periods.

- A single missile is confined to operate with only 23 shelters, all connected by a road which is constrained by barriers, so that monitoring is facilitated by having to look for only one missile/transporter in a group of shelters during inspection periods: missiles from adjacent roads cannot be readily introduced as a means of circumventing monitoring.
- The maintenance, fabrication, and assembly area is designed to conduct as much work as possible out in the open, easily monitored by satellite photography.
- The shipment of assembled equipment from the assembly areas to the deployment areas is via special transporters on special and identifiable roads, and at a slow pace. This procedure is designed to facilitate monitoring by satellites.

The first two of these four items add several hundred million dollars to the program costs; the second two cost much less. The total cost of these verification measures is less than one billion dollars, a cost which, in my view, is consistent with establishing a precedent for verification in the arms limitations agreements we all seek for the future.

Is the system too complicated to work? The basic elements of M-X are a missile with its erector-launcher, a shelter, and a transporter. MINUTEMAN has the same elements. The essential differences are that M-X has many shelters per missile instead of one, and the M-X transporter and shelter are designed so that an observer cannot determine whether a missile has been placed in a particular shelter or not. I have already mentioned our testing of a pre-prototype transporter which is at least as complex as the final transporter will be. During the next six years, I expect routine engineering problems to be encountered in design and testing of these system elements. I also expect that we will solve these problems to field a system which is practical and dependable. This is most aptly demonstrated in my discussion with General Ellis, the Commander-in-Chief of the Strategic Air Command which will operate this system. He has concluded after careful and critical review that the operation of the system is well within the capability of his command.

Can the system withstand increases in the threat? Yes, the MPS concept is highly resilient to increases in the number of warheads which can be used to attack it. Our studies continue to indicate that if the Soviets should increase their inventory of warheads with hard target kill capability, we could increase the number of M-X shelters at no greater cost than the cost to the Soviets of deploying the additional warheads. I believe, however, that the Soviets would be unlikely to initiate a warhead versus shelter race. In the first place, they would understand that a herculean investment in high technology products on their part could be countered by investment of a much smaller fraction of our GNP in concrete and earth-moving. In such a race, they would be investing in reentry vehicles located in conventional silos, where they would be highly vulnerable. I think it is much more likely that they would use their resources to make their ICBMs more survivable, perhaps with a system like M-X. If they chose this route, the cost exchange ratio of proliferating warheads becomes much more unfavorable to them. We have submitted to the Congress a detailed classified report explaining these tradeoffs.

Earlier in this statement, I indicated that engineering development activity by the Air Force is producing major design advances in several areas. Detailed studies are in progress, and will be concluded in the near future. We are examining the best spacing and layout for the structures to accommodate an increase in their number with greatest efficiency in terms of cost, time, and land usage. The easier and cheaper it is for us to build more shelters, the less incentive there is for the Soviets to try to outrun us.

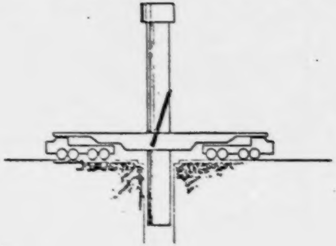
While I do not believe that we will ever face the necessity of a massive program for proliferating shelters, it is most important to understand that there is another option available beyond open-ended shelter construction. After some additional shelter construction -- perhaps doubling the number of shelters in the baseline -- it would in principle be highly cost-effective to go to ballistic missile defense (BMD). I cannot overemphasize that we would reach this stage only in a virtually incredible all-out arms race in which arms limitations had long since gone by the boards. As an example, if the Soviets were to go to 20 or 30 warheads for each SS-18, we could increase the number of shelters; if instead they were to double the number of SS-18 and SS-19 missiles, we could increase the number of M-X missiles, each with 23 shelters; if they did both - going to 30,000 warheads, we could do both and/or go to a BMD system. The Low Altitude Defense System (LoADS), tailored for protection of M-X, is a major part of our Ballistic Missile Defense research and development program. An MPS basing system is uniquely suited to protection by BMD since it is necessary for the attacker to target every shelter, while we gain the leverage offered by defending only the small fraction of shelters which contain missiles.

Moreover, the combination of survivability and resiliency offered by MPS basing and the BMD option, plus the counterforce flexibility provided by the M-X missile, are more than just insurance policies against so-called nightmare threats. In reality, they serve as powerful incentives for the Soviets to engage in a meaningful arms control process and adhere to the terms of agreements that flow from that process. In this way, M-X is an especially effective tool to support and enforce arms control rather than a contributor to the arms race.

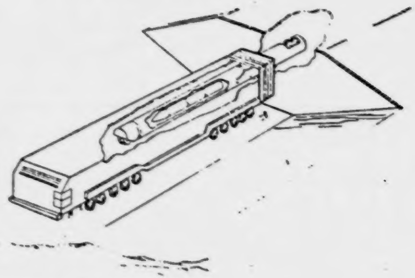
In summary, I am pleased with the outstanding progress the Air Force is making with the M-X system. Six months of intensive work on full-scale development have convinced us that our system concept is effective, economical, practical, and survivable. It will maintain in full measure the strength of the strategic triad which has protected us for decades.

# MPS DESIGN ALTERNATIVES

VERTICAL SHELTER



HORIZONTAL NON-INTEGRAL TEL



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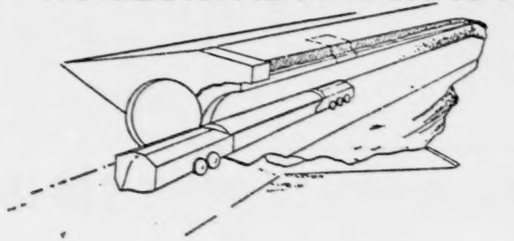
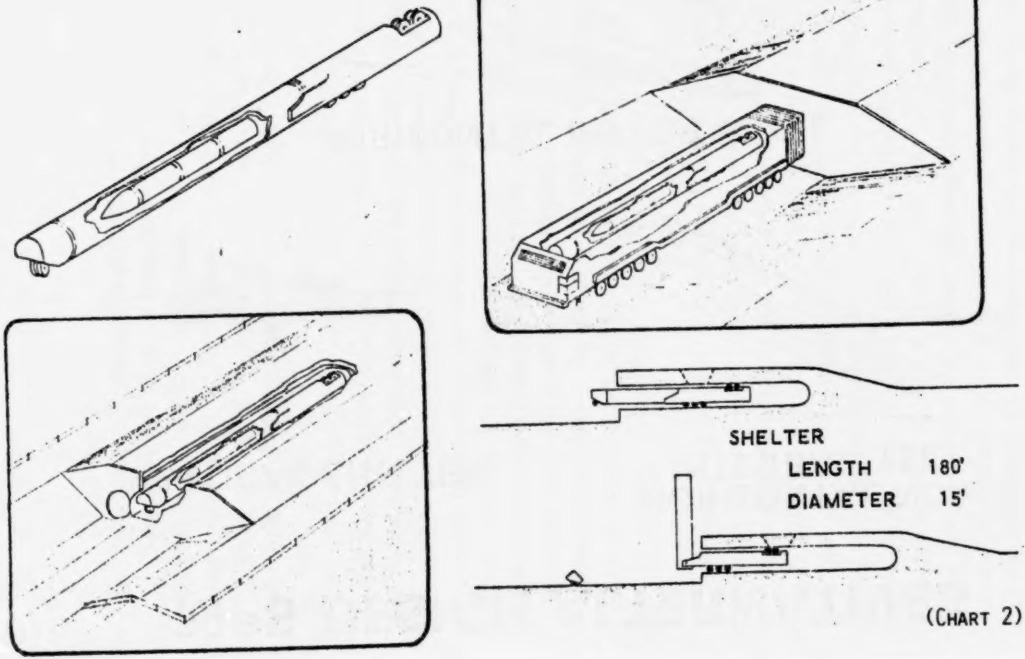


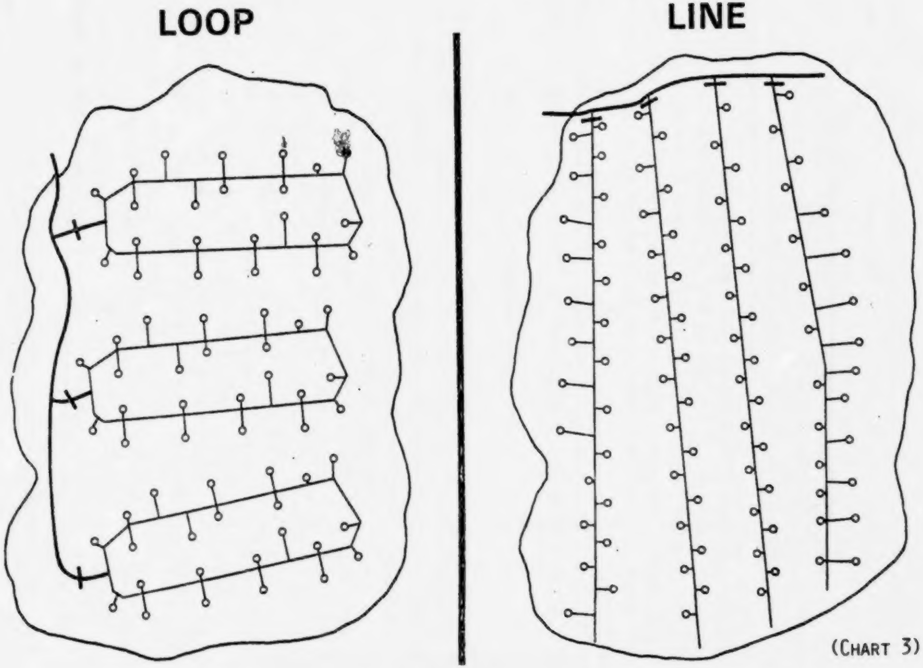
(CHART 1)

# Horizontal MPS System - Design Evolution



(CHART 2)

# MX ROAD LAYOUTS

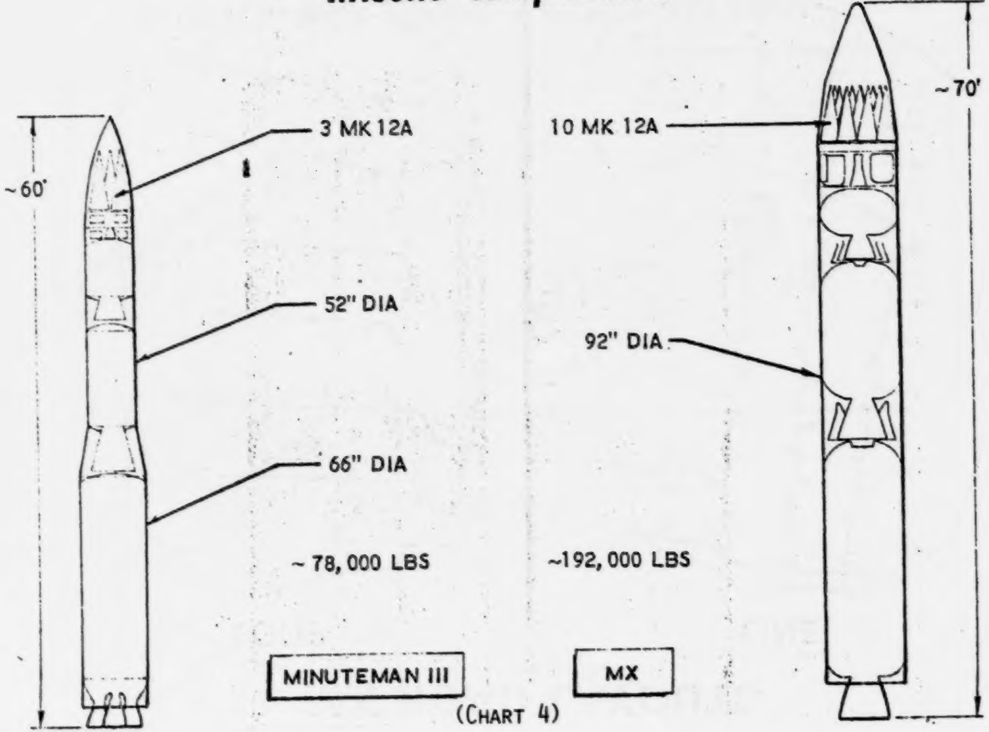


LOOP

LINE

(CHART 3)

## Missile Comparisons



(CHART 4)

### REEXAMINATION OF MX PROGRAM

Dr. **Perry**. Last fall, when we began the full-scale engineering development of the MX system, we proceeded on what I would call two parallel tracks. The first one was in recognition of the fact that Congress had approved the appropriation for this activity with the contingency that we conduct a reappraisal of the basing mode. One aspect of our study was indeed to reexamine the need and reexamine the basing alternatives.

The second path we pursued was the standard engineering attempts to make technical refinements in the design of the multiple protective shelter basing system. I would like to report to you on our progress on both of those tracks. There has been some confusion about the activity in one of those as opposed to the other. I will try to keep them separate.

Let me report briefly on the basic reexamination of need for the land-based missile system. I will do this in brief, summary form.

### VULNERABILITY OF MINUTEMAN

The first question which we addressed, and which many critics of the system have addressed, is: Is the question of the vulnerability of the Minuteman system a real vulnerability or a theoretical vulnerability? You have all heard the term "This is a theoretical vulnerability" with the presumption, therefore, that it may be ignored.

Up until December 1977, one could make a reasonable case that the vulnerability was theoretical. Up until that point the threat to the system, which is primarily from the Soviet SS–18 ICBM, had not yet matured, the reason being that, while the SS–18 missile is a very large missile, about four times the size of the Minuteman, and while it contains 10 independently targetable warheads, it had a very poor guidance system; therefore it delivered those warheads inaccurately, and we believed then, in that form, it did not pose a magnificent threat to the Minuteman force.

We further projected that the follow-on missile to the SS–18 would not become operational until the late 1990's and may or may not have an accurate guidance system with it. Up to that point it was theoretical.

### GUIDANCE SYSTEM DEVELOPMENT FOR SOVIET SS–18

In December 1977, the Soviets began to develop a new guidance system for their SS–18. At that stage we realized that they were making a deliberate and serious attempt to improve the capability of their SS–18 relative to its ability to attack hardened targets.

So we watched those tests very carefully. By the summer of 1978 we had sufficient data that we could make an estimate, and the estimate at that time was that this SS–18 missile now had developed an improved guidance system. The improved guidance system was estimated to have the accuracy which made that missile capable of attacking and destroying the Minuteman missile silos.

Further, we had means of estimating that that guidance system would be deployed in the Soviet Union in the early eighties rather than the late eighties, in the 1982–83 time period. We see them approaching, by 1980 through 1983, 3,000 warheads in their SS–18 force alone, each of which will be capable of destroying one of our 1,000 Minuteman silos. In the SS–18 force alone, they will have three times over the force necessary to destroy the Minuteman force.

Whatever theoretical aspects there are to that problem, the fact is that that system has been developed, the missiles are being deployed, and whatever uncertainties there may be in our calculations, the Soviets have accommodated to that by deploying three times as many needed to do the job. So I think there can be no serious doubt as to the reality of that threat.

### SOVIET THREAT TO U.S. SILOS AND MISSILES

The second question which has been asked and is still asked today is: Even recognizing that the Soviets can destroy our silos, why does that pose a threat to our missiles? Why do we simply not launch the missiles out of the silos before the silos come under attack?

We indeed, today, have deployed warning systems which are capable of warning us of the advent of a Soviet missile attack and warning us in sufficient time that we could conceivably launch our missiles before the strike occurs on them. So it is tempting to consider that we could ignore the threat to the silos and go on to a policy whereby we would simply launch our forces out from under that attack.

I can say to this committee that, whatever other doubts I have about various aspects of this problem, I have no doubt at all in recommending to you strongly against the United States embarking on such a policy or ever making the survivability of our strategic deterrent depend on that sort of policy.

The reason for my concern is very simple. That is, if the Soviets were indeed to launch an attack against our 1,000 Minuteman silos, knowing full well of the existence of our warning systems, they would surely simultaneously launch an attack on our warning systems.

Therefore, whatever kind of detailed information we get about a missile attack, about missiles being launched in peacetime, would surely not be available to us at the time it was needed—namely, at the time that attack was taking place.

The information that the President may very well be confronted with then is not detailed radar information describing the location of missiles approaching the United States but simply a report that our warning system or communication lines to that system are, for some reason, malfunctioning, and we may presume that that attack is under way. On the basis of that information, in a time period of about 10 minutes, the President would then have to decide whether or not to launch our ICBM force.

I submit to you that that is a position we do not want to place the President, our national commander, in.

### MOBILE DEPLOYMENT OF U.S. MISSILES

The conclusion that we come to is that it is essential for the confident survivability, of our strategic forces to have them deployed in a mobile fashion. Since any fixed basing system can be attacked with the highly accurate guidance system which the Soviets now have, the way to defeat that tactic is to make them uncertain as to where to aim the missiles—that is, to introduce mobility into our basing system.

We have examined in very great detail many different ways of making these missiles mobile. We have considered an air mobile system where we put the missiles on a large transport airplane. We scramble that airplane on alert, which we can do without committing to an attack, and then the missile is launched from the airplane if that should ever become necessary.

It is feasible to design, develop, and deploy such a system, but that system would be, first of all, vulnerable to a barrage attack by the Soviet ICBM's. The Soviets, even in present projections, have such a large number of ICBM warheads—we project more than 6,000 before 1982—that it would be possible for them to barrage the entire Midwestern United States, where these airplanes would be based, and destroy the airplanes even though they are already leaving their bases.

In order to defeat that tactic, it would be necessary to make the planes extremely hard to attack, to introduce, in effect, an armor plating to the airplane to resist the very high overpressures that would come from a nearby nuclear burst.

That move renders the airplane approach extremely expensive, much more expensive, for example, than the MX system which we are proposing to you, probably 50 percent more expensive.

### ROAD MOBILE SYSTEM

We also examined a road mobile system where the missile was put on a transporter and the transporter was in continuous motion over a road, thereby introducing uncertainty as to its location. In order for this system to be successful it has to have a very wide area of deployment. Essentially it has to be free to deploy over the entire public road system in the United States.

That introduces what we believe to be the unacceptable risk of having nuclear-tipped missiles being transported over the public road system in peacetime. So we have rejected that alternative.

### SUBMARINE MOBILITY

We have considered in very great detail making the missiles mobile by putting them on a submarine. Indeed, we have almost half of our strategic forces today deployed on submarines. Our concern, then, is not with having missiles on submarines, which we believe is a crucial part of our strategic forces; the issue is whether we should put all of our strategic missiles on submarines.

We believe that that would be an imprudent action for the United States to take. The reason is that anyone who argues that we should put all of our strategic missiles on submarines is, in effect, willing to gamble that in the 1990's the Soviet Union will not be able to develop and deploy a system capable of locating our submarines at sea and therefore capable of attacking them in a surprise attack.

To give your one number to put this in perspective, if the Soviets were able to locate our submarines at sea, even with the crude uncertainty of about 25 miles as to location they could barrage attack all of our submarines at sea with fewer missiles than it would take them to attack our Minuteman silos.

They certainly do not have that capability today, but I for one am not willing to gamble our entire strategic force that the Soviets will not develop that sort of capability over the next 10 to 20 years.

### MULTIPLE PROTECTIVE SHELTER SYSTEM

That, then, takes us to a ground mobile system which we call the multiple protective shelter system. Now, the question has been raised several times, and I will paraphrase it somewhat: Why do we keep changing our design every month? I would like to ask that question and then answer it for you.

When Dr. Brown and I came into the Defense Department in early 1977, one of the first things we did was examine the MX program that existed at that time. It consisted of a missile called the MX and it consisted of an approach on basing which, in early 1977, was to put the missiles in a linear trench.

Very early in our analysis we accepted that missile as a reasonable design, as a reasonable approach to the problem. That is basically to the same missile we now have under full-scale engineering development.

### REJECTION OF LINEAR TRENCH

But we rejected then—that was still in 1977—the linear trench. The reason we rejected it is because we concluded that a nuclear burst on any one segment of the trench could very well destroy the missile wherever it was located in the trench because of the propagation of nuclear effects through the length of the trench.

We therefore rejected the linear trench, which was the basing system which existed in 1977, and we would reject it today if the question came up.

We then went into a study of what the appropriate basing system was and we concluded in early 1978, that the best approach was multiple protective shelters—that is, to make about 5,000 hardened shelters and take about 200 missiles and move them among those 5,000 shelters.

That was the design which we conceived in early 1978 and that is still the design we are proposing today. The changes from then to now have been primarily in the nature of technical refinements on the multiple protective shelter basing system.

Now, the second question which has been asked, and it has been asked specifically on the multiple protective shelter, is: What in the world caused us to settle on such a "Rube Goldberg" design? Since I am one of the perpetrators of this design, I may be a little sensitive to that name.

Senator GARN. I confined my remarks to the racetrack and automatic dash. That was the reference, not to the multiple protective structures.

Dr. PERRY. Thank you, Senator Garn.

I would like to describe in simple terms what the multiple protective shelter system consists of. I will briefly evolve it from one refinement, to another, but what I am saying really applies to all of the designs.

## COMPONENTS TO MULTIPLE PROTECTIVE SHELTER SYSTEM

The multiple protective shelter system has four components to it. It has a missile, transporter-launcher, shelters, and roads. I would like to compare that with the Minuteman system. The missile in the MX system is a very straightforward technical evolution of the Minuteman missile, about twice the size and using improved fuel technology which, as a matter of fact, is already being deployed in the Trident missile.

From the technical point of view, it is a straightforward evolution, with no real complexity, or technical risks associated with it.

The transporter-launcher for this system is a big vehicle. If you were to stand beside it and look at it you would be impressed with its size. It is not a technically complex vehicle; it is the same level of complexity as the very large earthmoving equipments which have already been built for the construction industry. We have no real concerns about our ability to design and build that transporter-launcher.

The third component of the system is the shelters. Horizontal shelters are, in fact, smaller and simpler than the shelters which we have already built for the Minuteman missile. The only difference is that there are more of them. We are proposing 4,600 shelters for the 200 MX missiles whereas we have 1,000 shelters for the 1,000 Minuteman missiles.

Finally, there is the road system. The road system is extensive and involves many thousands of miles of road, but the roads we will be building are simply gravel-aggregate roads of a very simple and straightforward design. There is no technical complexity in the system. The system is large in scope but it is not complex and it is simple to operate.

## OPERATIONAL COMPLEXITY

Now let me address the question of operational complexity. In the design that Dr. Brown described to you, which we consider the final refinement of the system design, the 200 missiles will be sitting in the shelters virtually all of the time. The concept that the missiles would be moving around on the road is an improper concept; 99 percent of the time the missiles will be simply sitting in the shelters.

Every few months, when it comes time for maintenance of the missile, we will take it out of the shelter to its maintenance area, perform the maintenance, and then return it. But in the case of the Minuteman, we return it to the same shelter. In the case of this system, we will return it to a different shelter and we will do it in a deceptive manner so that an observer will not be able to tell to which of the 23 shelters in the deployment area it had been moved.

So the only thing subtle about the system is the deceptive manner in which we place the missile in the shelter. That will happen ordinarily once every several months. We believe that that in itself will be adequate to maintain the survivability of the system.

We have one additional feature which we believe is important; and that is, if the Soviets in some way locate the missiles or even if they believed they had located the missiles or even if we believed that they believed that they had located the missiles, any of those situations would affect the confidence we have in our deterrence.

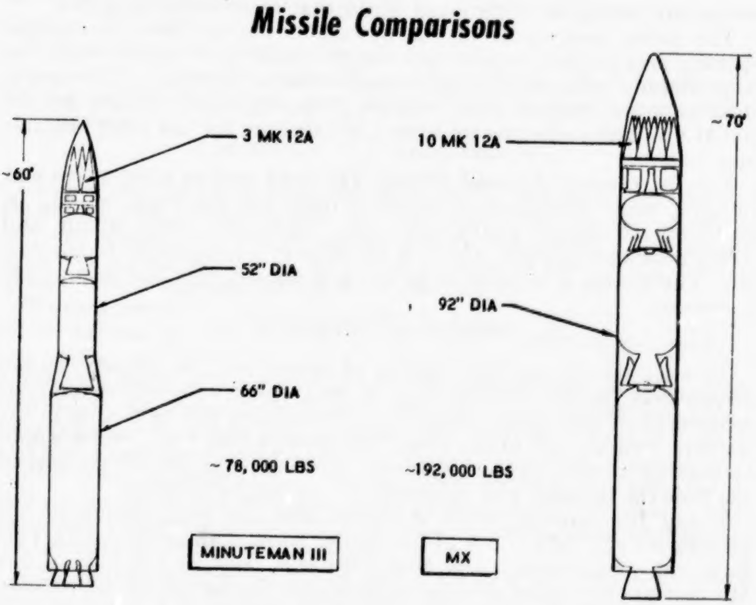
Therefore, we would like to be able to move the missiles quickly. We would like the Soviets to understand that, even if they think they have located a missile, they cannot be sure that the missile will be located in that specific shelter when the attack arrives.

### HORIZONTAL SHELTER

Therefore, we have required the system to be designed in such a way that it could be reconfigured rapidly, in a matter of tens of minutes instead of tens of hours. That has been the single factor which has driven us toward the horizontal shelter instead of a vertical shelter.

I would like to, in 2 or 3 minutes, quickly run through some charts which simply show you the new geometric layout of the system we are talking about and then I will entertain questions.

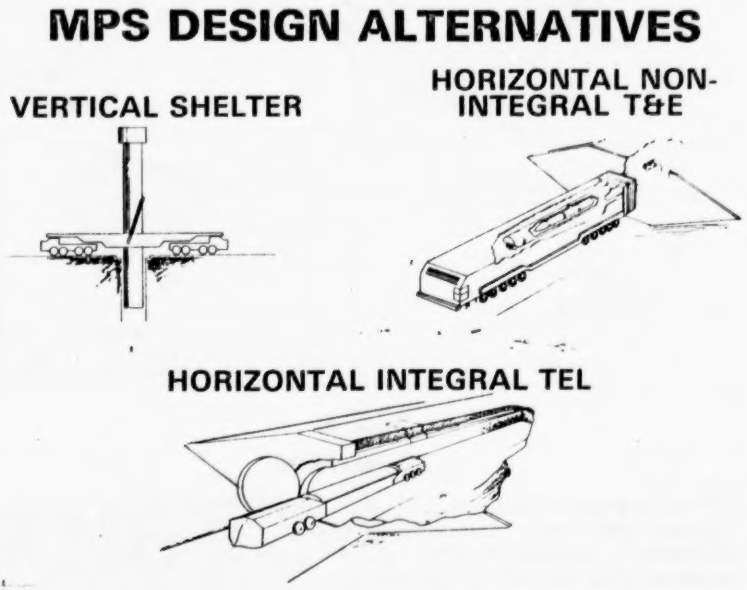
May I have the first chart, please?



[CHART 1]

MISSILE COMPARISONS

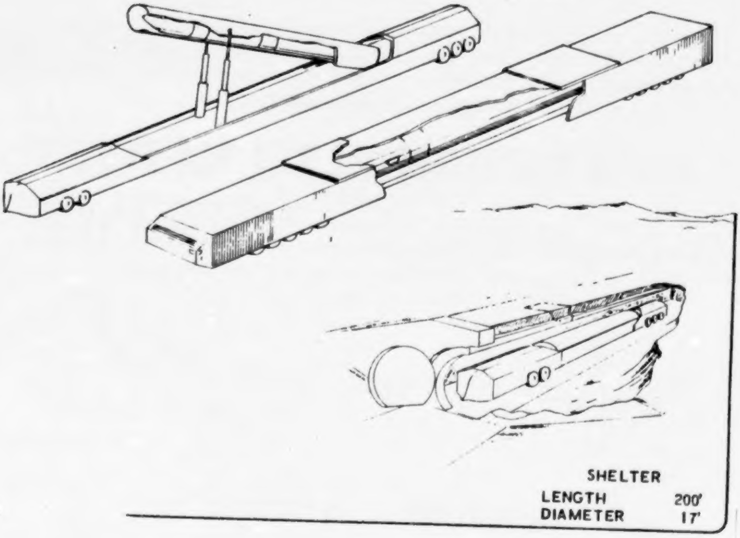
I would like to refresh you on the missile. This is the MX missile, a little more than twice the size of the Minuteman, 10 warheads instead of 3 warheads, and a considerably more accurate guidance system but basically a straightforward technical evolution.



[CHART 2]

MULTIPLE PROTECTIVE SYSTEMS

These are the three multiple protective systems which we examined as part of the full-scale engineering development phase. This is a vertical shelter. This is a horizontal shelter in which the entire missile and transporter is housed.



**Baseline - Horizontal MPS System**

[Chart 3]

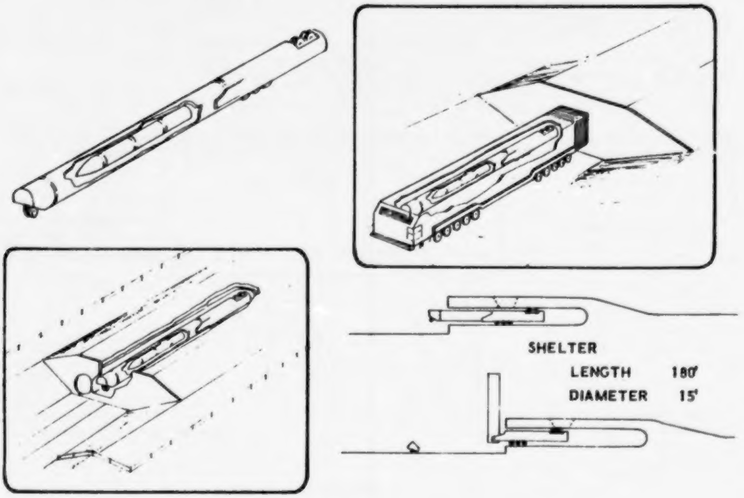
### BASELINE SYSTEM

That is what we called our baseline system. That was the approach we used going into full-scale engineering development. We have evolved to a horizontal shelter which houses only the missile and the launcher. That is, the transporter drives up to the shelter, it slides in the missile and the launcher and then the transporter drives away.

That is the essential change, the essential evolution that was made that allows a small shelter to be built. It allows a smaller and simpler transporter-launcher to be built and it allows a simpler road network to be built.

It has the primary effect, then, of lowering the cost of the system, lowering the environmental impact of the system, while still maintaining the same operational effectiveness.

This is simply a detail which shows you the baseline design in which the entire vehicle was moved into the shelter.



Horizontal MPS System - Design Evolution

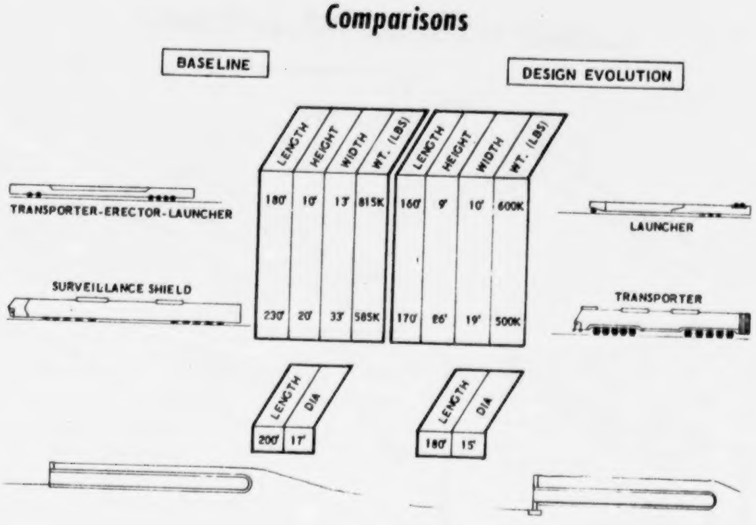
[Chart 4]

DESIGN EVOLUTION

Now I will show you the detail of what we have evolved where the vehicle approaches the shelter. As you can see from these two cutaway drawings, only the missile and the launcher enter the shelter. In this system, if it is necessary to launch the missile, the missile and the launcher roll out of the shelter and then there is a cantilever arrangement which causes the missile to be launched, erected in the following fashion.

Senator Laxalt. So the launching would take place outside the shelter?

Dr. Perry. Yes. Actually in all of our systems the missile has to, in some way, break out of the shelter for launching. In the baseline design, we envisioned going through the roof. It was that feature of going through a roof which caused considerable complexity and weight to be added to the transporter. We were able to avoid that by going to this alternative approach. This is a snowplow approach which plows its way out and then makes the vertical launch.

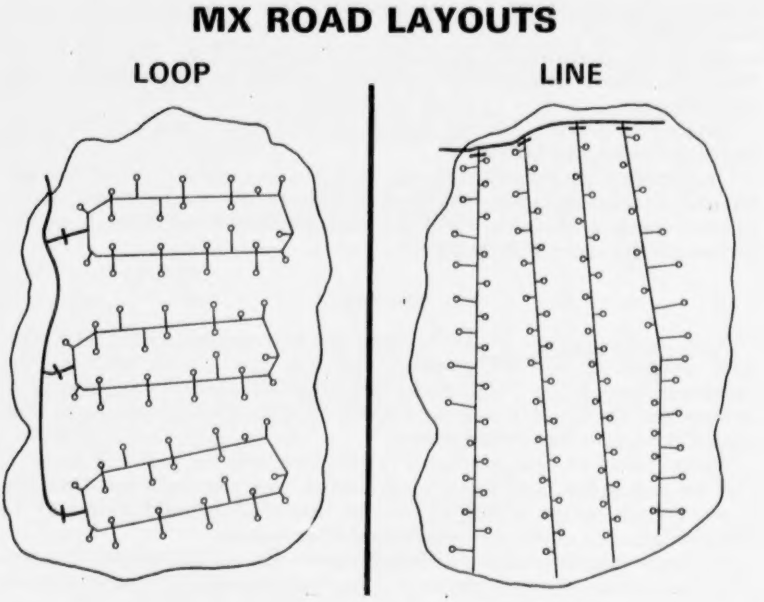


[CHART 5]

DESIGN COMPARISON

I won't dwell on this chart but this simply gives the figures which show you that, evolving from this design to that design, we have a smaller transporter-launcher, we have a smaller shelter and, all in all, have a simpler and less expensive system.

Finally, as I pointed out to you, with that design evolution there is no longer any advantage to putting the system in a loop or racetrack deployment.



[CHART 6]

###### BASING SUITABILITY

Now, I have depicted here a hypothetical layout in a valley. This uneven line, perimeter line, describes the perimeter of the valley in terms of being suitable for basing. You might imagine this to be a topographic contour line. In the loop layout, we would have a road coming into the valley and then we would have the race tracks coming off it. In this system it would be possible to have a linear deployment. That could be either a straight line or it could conform to the topography of the valley.

###### LINEAR SYSTEM PREFERRED OVER LOOP SYSTEM

Our preliminary analysis on this suggests that the linear system is to be far preferred over the loop system. First of all, it will involve perhaps as much as a 20-percent reduction in the linear miles of road which have to be built. Second, it is obviously a more useful and less obtrusive type of deployment.

Finally, we believe that we would be able to get more deployment in a given valley—that is, more efficient packing—and therefore we would need to deploy in fewer valleys.

All of those features, then, we think are a significant improvement in the design. The only hesitation we have at this stage in describing to you the exact characteristics of that layout is that we will have to do simple engineering studies on a valley-by-valley basis to decide the optimum layout. What I have described here is a generic layout of the system.

All of the evidence we have seen to date would say that we would favor the linear deployment because it would be more efficient and less intrusive.

Senator GARN. Dr. Perry, on that point I think you also estimate it will save about $2 billion.

Dr. PERRY. Our present estimate is that the aggregation of savings from all of these changes—the smaller shelters, the smaller transporter, shorter roads and so on—will be perhaps somewhat more than $2 billion, on the order of $2 billion.

### SUMMARY

Now to summarize. In 1977, when we first examined the MX system, we first of all had to deal with the question of whether the vulnerability of the Minuteman was real or theoretical. We have determined that it is a real vulnerability, that the Soviets have that capability and it cannot be ignored.

Second, we had to deal with the design which we received in 1977, and we concluded that the missile design was adequate but that the linear trench design which existed at that stage should give way to what became the multiple protective shelter system.

We have examined three different forms of multiple protective systems—a vertical shelter system and two horizontals. Of the two horizontal systems, one was a closed loop or race track and the other was linear. We combined the horizontal shelter with a linear deployment, and that was the nature of Dr. Brown's report to the Congress which he sent in somewhat over a week ago.

As far as Defense Department studies are concerned, they have concluded that the MX system is needed for national security, that the design has been completed and it is ready for approval, ready for being built, and that whatever changes are made in the design in the months to come will be in the nature of fine-tuning, design refinements, rather than any significant changes to it.

We have more study and analysis to do on the environmental impact. The environmental impact statement will be concluded this year and we will examine, among other things, the split basing alternative.

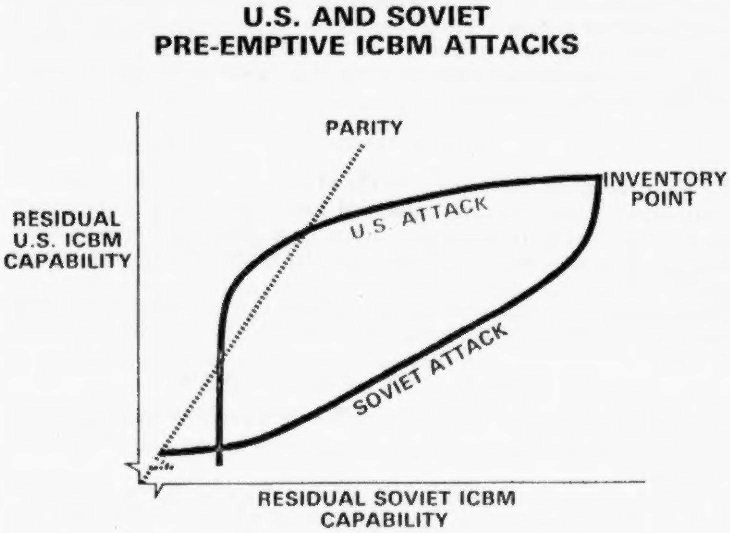
Mr. Chairman, from a design point of view, we are ready to proceed and are proceeding on the development of this system. From an environmental impact point of view, those studies are still going on, but the environmental statement itself will be concluded before the year is over.

Any major uncertainty about proceeding on a program on the part of the Congress at this stage would introduce a delay which, from September on, would be a month-to-month delay in the final operational date of the system on the one hand.

On the other hand, if we were to continue to proceed with two or three parallel designs, it would involve a very substantial increase in cost over what we have estimated. I will be happy to answer questions.

Senator HUDDLESTON. Thank you very much, Dr. Perry. You and Secretary Brown both have discussed the relationship of this system and the basing mode to a SALT environment or a non-SALT environment. You have indicated that you think it does have the flexibility to respond to a nonrestrained increase by the Soviet Union in the number of warheads?

Dr. PERRY. Yes, I do, Mr. Chairman. I would like to show you one more chart in response to that particular question.



[CHART 7]

### U.S. RESPONSE TO SOVIET THREAT

Our analyses of how we would respond to the Soviet threat are generally classified. What I would like to do is give you an oversimplified but, I think, instructive report that can be done at the unclassified level.

This is a chart which we call, in strategic analysis, a draw-down chart. In order to understand the proper answer to the question you raised, it is necessary to look at this sort of analysis. What I have depicted on the horizontal axis here is the number of ICBM-warheads in the Soviet Union, and on the vertical axis is the number of ICBM warheads in the United States.

The starting point on this curve represents the number of warheads the Soviet Union now has deployed and the United States now has deployed. Since this is unclassified, I have done this without the benefit of numbers.

If we look at this bottom line, this depicts what would happen in the dynamics of an attack by the Soviet ICBM's against United States ICBM's. It is clear that two separate things would happen. First of all, because they are expending their ICBM's, theirs are drawn down; and, second, because they are attacking ours, ours go down.

This represents how that would happen if the Soviets were to attack. This is generically designed to represent an attack against our presently deployed missiles, in which case you see that the line is very steep. It is steep because they can, with a single warhead or close to two warheads, destroy a Minuteman III, which has three warheads. You would say that the exchange favors them.

This very shallow, flat part of the curve represents an attack on an MX system. In the MX system, it requires 23 warheads from the Soviet Union to destroy one MX which has 10 warheads on it. So this attack, then, is disadvantageous to them, as Dr. Brown indicated. That means basically that the more they attack an MX system, the less advantageous their position becomes.

### MISSILE DRAWDOWN

We have designed the layout of the system so that they would essentially draw down their entire ICBM force before they would draw down ours. At any point they stop along here, they are worse off than when they started. The farther they go, the worse off they become on a relative basis.

That is what we mean by deterrence. There is no military advantage to them in attacking the system. The more they attack, the worse off they are.

### RESPONSES TO SOVIET MISSILE INCREASE

Senator HUDDLESTON. If their number of warheads increases dramatically, it would also necessitate an increase in our number of MX deployments?

Dr. PERRY. Yes. As I indicated, I have not drawn a curve with numbers on it. This is an approximate picture of what it would look like with the presently planned MX missile deployment and presently projected Soviet forces.

If they were to double the number of warheads in their force, then we would have two different responses: One of them would be to deploy more shelters; that is, enlarge the MX deployment. That is, as they moved over in the graph in this direction, we would have to have a longer period of resilience here, and we would want to go up in that direction.

A second alternative would be to install an antiballistic missile system to protect that MX missile which is being attacked. The concept of an antiballistic missile system in this case is that if you had one MX missile in 23 shelters, you would deploy an ABM interceptor whose job it was to defend only that one shelter; it would not defend the other 22 shelters.

Senator HUDDLESTON. Do you think that without the restraints of SALT that an ABM system is inevitable?

Dr. PERRY. No, I don't. Let me come back to that question in a minute.

The effect of an ABM on this chart would be to take this curve and make it flatter, because it would take two or three times as many warheads for them to destroy one of ours. The attack would therefore become more disadvantageous to them.

So, you would have two different responses: One of them is more shelters and the other is ABM. Obviously you could have a combination of those two.

I think the important factor is that if we have, and if we can make clear to the Soviets, a clear option for responding to an ICBM buildup, either with shelters or with ABM or with both, we should be able to provide a disincentive to the Soviets to make that buildup to begin with.

But it has to be very clear to them that there will be no military advantage to them to make this buildup. It is not enough to have the possibility of doing that; it has to also be clear that we are prepared to do it, if necessary.

### TIMING FACTOR

The other factor that needs to be taken into account is the timing.

Could they double or triple their warheads in such a time that we could not respond? That is, we would be 5 or 10 years behind? I believe the answer to that is that doubling or tripling ICBM warheads in the Soviet Union would be an act that would be telegraphed many, many years ahead of time, and we would simply adjust our plans for deployment as we were deploying the system.

The important point though, is for the Soviets to be clear that we have this capability, so that we provide a disincentive to them to make that move.

### VERIFICATION REQUIREMENTS

Senator **Huddleston**. Now, assuming there will be a SALT agreement, are you confident that in this evolution of the basing mode and what yet may come that you maintain the verification requirements that are necessary?

Dr. **Perry**. Yes, I believe this system can be readily verified. It has two basically different ways in which it could be verified: We would plan to conduct the deployment in such a way that it would be obvious that there was only one missile moving into each deployment area.

Second, we would propose to give the Soviets the right to challenge; that is, if they challenged that we had more than one missile in a given deployment, we would offer for that deployment area to remove portholes for each of the shelters for the examination.

We would not want to uncover too many missiles at a time, so that we would not unnecessarily expose our system. We would be willing to agree that they call the time and call a reasonable number of shelters, and we would open the shelters for view from their satellites.

### MISSILE LAUNCHERS

Senator **Huddleston**. Will there in fact be only one launcher for each missile, since the treaty in its present form deals with launchers rather than missiles themselves?

Dr. **Perry**. The missile launcher is always together in an integral unit in any of the deployments we have looked at here—the three cases, vertical shelter and horizontal shelter, the detachable system—in all three of those cases the shelter itself is not a launcher; it could not launch a missile; it is only a concrete garage which stores it.

Senator **Huddleston**. You are confident that we can persuade the other side that it is verifiable?

Dr. **Perry**. I wouldn't want to offer any opinions about how smoothly that discussion might go, but I am confident that it is verifiable, that it can be obviously argued as verifiable.

I also would point out that President Carter made a point of announcing his approval of the MX system before he went to sign the SALT treaty, so that there would be no doubt in the minds of the Soviets about our intentions.

### MEANS VERIFICATION

Senator **Laxalt**. This would require, obviously, on-the-ground verification?

Dr. **Perry**. I don't believe so. With our cooperation, with our willingness to open the lids of the shelter system, I believe it could be adequately verified by what we call national technical means—satellites.

Senator **Huddleston**. If it will require us to do something that we have not asked or expected the Soviets to do, the degree of cooperation would be much greater?

Dr. **Perry**. That is right. If the Soviets were to deploy a system of this type, we would require the same degree of cooperation from them.

Senator **Huddleston**. What is your expectation that the Soviets might deploy a system of this type?

Dr. **Perry**. I think that it is extremely unlikely, Senator Huddleston, that it would be of this specific type. I do believe that they will see the same necessity that we have seen for going to mobile systems; therefore, I think, during the 1980's we will see a greatly increased emphasis on their submarine-launched missiles and greatly increased emphasis on their mobile ICBM's.

The technical approach to a mobile system they have chosen today, and which I believe they will continue, is a road mobile system, as opposed to a multiple protective shelter. They do not seem to have the concern which I expressed to you, that we have, about driving their missiles with warheads on over the public roads. In fact, they have such a system deployed today and do drive them over public roads.

Senator **Huddleston**. I yield to Senator Laxalt.

### SIGNIFICANCE OF THE 200

Senator **Laxalt**. What is the magic of the 200; is that within the framework of SALT?

Dr. **Perry**. No; the number 200 has nothing to do with SALT; it was originally sized, Senator Laxalt, simply to restore the capability we had before the Minuteman system became vulnerable.

To answer your question, there is nothing magic about 200. We could put 300 or 400 missiles in those shelters.

Senator **Laxalt**. A hundred?

Dr. **Perry**. As we get down below 200, then we would have to accept a smaller capability in our land-based forces than we have had with Minuteman. That conceivably could be done, but I would not recommend it in the face of the very great buildup of the ICBM's that the Soviets have.

I think any considerations we would have about changing that number would probably be on the upward side, rather than on the downward side.

Senator LAXALT. You consider the 200 to be a minimum requirement then?

Dr. PERRY. I do, with the present Soviet ICBM deployment.

### SUBMARINE-LAUNCHED MISSILES

Senator LAXALT. You discussed the submarines, and I think fairly so. We have had a lot of presentations made to us, some of which have been rather persuasive to me, and we will have some, I guess, tomorrow.

Would it be in terms of the deployment of the MX missile that you are putting too many in the land-based basket? Why could we not divide the portion of 200 between land-based and submarines?

Dr. PERRY. We have already, Senator Laxalt, about half of our strategic forces in submarines and in terms of ballistic missiles two-thirds of our ballistic missiles are already in submarines.

Senator LAXALT. How about the type that was described, that would simply be offshore? I know the cost problems; I know the possible surveillance problems. It seems to me that sometimes the problem is being approached in terms of absolutes.

The submarine people make a rather strong case for this—I know Senator Hatfield did last year. If you are talking in terms of absolutes, has any real consideration been given by you people as to whether we could divide the MX between land bases and submarines in the fashion that they described?

Dr. PERRY. I see no real advantage of doing that, Senator Laxalt. If we wanted to increase our submarine missile forces, we could do it either by increasing our Trident force or by developing and building a new large submarine, such as has been proposed.

Senator LAXALT. You mean the offshore proposal to you does not make any sense; you would go purely to Tridents?

Dr. PERRY. If we were going to increase our submarine forces beyond what is now projected, I think it would be a fair consideration to look for the best submarine design for that purpose. A smaller submarine with an MX missile, instead of a Trident missile is something that could be fairly considered.

Our analysis of that to date indicates that there is neither a cost advantage nor a schedule advantage in doing that.

### DUMMY HOLES AT ICBM SITES

Senator LAXALT. Let me ask you this: What consideration, if any, has been given to taking MX and going to the existing ICBM sites and drilling a lot of dummy holes out there? This would in fact be a shell game, which would get us away from the land acquisition problem, give us diversity, and, I am told, save a lot of costs.

Dr. PERRY. I think I followed you, but could you repeat that again?

Senator LAXALT. Stuffing the existing holes so that we get back to the shell game.

Dr. Perry. Minuteman sites?

Senator Laxalt. Minuteman sites with MX's.

Dr. Perry. Let me separate two different factors here: We can replace Minuteman with MX's; that is the Minuteman silos will certainly accept an MX missile. That still only give us a thousand Minuteman shelters; it does not give us any improvement in survivability.

We would have to build more shelters.

The second issue then is, what is the advantage to building more shelters? I guess in a word I don't see any advantage to that. I see a lot of disadvantages.

Senator Laxalt. Don't you think it is an advantage to go to areas which have already adjusted to this situation in terms of public impact and acceptability? Isn't that a distinct advantage?

Dr. Perry. We would have to go to the area in which Minuteman is now deployed and start from the beginning with the environmental impact statement and land acquisition process.

Senator Laxalt. How much time would we lose in going through that process?

Dr. Perry. We are a year or a year and a half into this process. That process is probably more complicated because of the more intensive use of the lands in those areas.

Senator Laxalt. That could be.

Dr. Perry. I can state categorically it would take longer and would be more expensive. You cannot rule it out categorically, no.

Senator Laxalt. You have not.

Dr. Perry. No. I said we have rejected it for reasons that I have described, but there is no technical reason why that cannot be done.

### ENVIRONMENTAL PROBLEMS IN MX BASING

Senator Laxalt. I sense—it does not take any great wisdom to sense it—some substantial environmental clouds on the MX basing, clouds of the type I would think that we saw in connection with the pipeline in Alaska. You people don't think for a moment that you are going to go blithely forward and get an appropriation and authorization and go ahead and and put a system in there without serious environmental opposition and extensive litigation, do you?

Dr. Perry. I have been personally exposed to a great deal of serious environmental opposition. No, I don't think that for 1 minute.

Senator Laxalt. We are not being realistic unless we can put into place here a mechanism to dispel all of that. We took 7 years to get through the Alaskan problems; it would take 7 or more years to get the MX problem if we get into litigation route. Isn't this an essential part of the package, that we fast track it?

Dr. Perry. I believe, myself, that the plan that we have embarked on is compatible with the 1986 IOC, even in the face of environmental objections.

I would like to defer a detailed discussion of that to Secretary Chayes this afternoon, who is personally working on that problem. Also, she is a lawyer and can speak much more authoritatively about the legal aspects of it than can I.

Senator **Laxalt**. I don't know whether Senator Garn appreciates that or not.

That is all I have for the moment.

I would like for the purpose of the record to indicate that you have been very helpful in helping me to understand the whole system and the problems. The fact that you have been understanding is what I appreciate more than anything else.

Dr. **Perry**. Thank you, Senator.

Senator **Huddleston**. Senator Garn?

### RACETRACK SYSTEM

Senator **Garn**. Thank you, Mr. Chairman.

Dr. Perry, in my opening remarks I talked about racetrack. There seems to be some reluctance to just come out and say that the closed loop is not being considered. I saw your diagrams of the linear road system. All of the improvements that have been suggested as technical refinements obviously lead to the conclusion that you are no longer considering the closed-loop system. Now, is it possible to get just a straight statement, "Yes, Senator, that is correct, we are looking at linear or grid; we are refining it; we are no longer considering the closed loop, or so-called racetrack"?

Dr. **Perry**. Yes.

Senator **Garn**. Thank you.

Senator **Laxalt**. A significant achievement.

Senator **Garn**. Second, of those who oppose MX, not just those of us who have concerns about its deployment method, but also those who would like to kill MX in general, I continue to hear this argument about SALT. I think the facts speak for themselves.

It is not true that sublimits of 1,320 MIRVed systems under the SALT II Treaty is an increase of over 500 MIRVed systems over and above what the Soviets currently have, and therefore there is allowed a massive increase in the number of Soviet warheads within the constraints, or so-called constraints, of SALT II?

Dr. **Perry**. It is an increase over what they have, but it is not a massive increase over what we have. We have many more MIRVed systems today than the Soviet Union.

### SUPERIORITY IN MIRVED SYSTEMS

Senator **Garn**. We have more MIRVed systems. They currently have in round numbers 795. That would allow an increase of over 500.

The point is that the reduction of 250 strategic launch vehicles that are talked about by arms controllers is not a significant decline; these 250 launchers, all of them single warhead launchers, would be replaced legally within the terms of the treaty with over 500 MIRVed systems—some of which can carry 10 warheads. You are correct; we still have more MIRVed systems but with far smaller yield warheads.

I just wanted to establish the point that SALT II did allow massive increases in the number of nuclear warheads allowed the Soviet Union to as much as 12,000 to 15,000. If we get into the argument that SALT would protect the MX system, I simply don't think the facts bear that out. The numbers are 1,320 total MIRVed systems, 1,200 MIRVed ICBM's and SLBM's, and 820 MIRVed land-based ICBM's. These are the numbers in the treaty, not Jake Garn's opinion, not anybody's opinion; these are facts, and these are huge increases in the MIRVed systems allowed the Soviet Union.

The other point I would like to make is that we constantly hear that without SALT the Soviet Union will be allowed to increase the number of warheads on their ICBM's; for example, on the SS–18. That is a true statement. It it not also true from a technical standpoint that were they to do that to the SS–18, to use as an example, which can only carry so much weight, like any aircraft or any system, and without getting into classified information—and I am bordering on it, so I will be careful—but without getting into classified information, the SS–18 can only carry a limited number of warheads while still retaining a hard-target kill capability. We certainly know that the SS–18 can carry 10 nuclear warheads. We do have indications that it could carry 12 of the 1-million-ton variety.

As they increase the number of warheads to, say, 20 or 30, isn't it true that the megatonnage of those warheads would have to be reduced considerably so that the missile would be able to carry the weight?

Dr. PERRY. Senator Garn, that is a hard question to answer precisely in an unclassified session. Let me give you a somewhat imprecise answer. I will be happy to make a more precise reply.

Senator GARN. Let me save you the time; you can answer it for me in a classified way at some other time.

Let me just say that I don't have to have your doctor's degree. Just being an old military pilot, I knew I could carry so much weight. It is a practical fact that the SS–18 can carry only so much weight and therefore, as you add warheads you have to obviously keep within weight constraints.

The only way you can do that—if you go to 20 or 30 warheads—is to reduce the megatonnage of each considerably. Therefore, the Minuteman III system does not become as vulnerable, because it is a function of accuracy versus megatonnage?

Dr. PERRY. Could I make one comment on that?

Senator GARN. Let me just finish my statement, and I will be happy to hear from you. I would be happy to see the Soviet Union attempt to put 30 warheads on an SS–18, because I think that with the problems associated with such a move, our Minuteman force would not be nearly as vulnerable with the smaller megatonnage weapon.

Dr. PERRY. If they doubled the warheads on the SS–18 to 20 or 25, and if they held constant their nuclear technology and their guidance technology, then what you are saying is absolutely correct. It would reduce the threat, rather than increase the threat, to hardened, fixed-point systems.

If, at the same time they did that, they made major improvements in guidance and in technology, then it could increase the threat.

I would not project all of those things happening at once, but I could not rule out the possibility.

Senator GARN. I think the Soviets would be more likely to develop a new missile, as they do have several in research and development, rather than retrofit an SS–18 any way, because time and money constraints in that redesign might be more difficult than a new missile.

### SUM SYSTEM

Mr. Secretary, let me ask you a question, getting back to SUM and talking about putting our eggs in one basket. I used to be a Navy pilot many years ago, and spent a good deal of time looking for submarines in an ASW squadron. I am well aware of the dramatic improvement that we have made in our antisubmarine capabilities over the last several years.

I am also aware that this is one area in which, at least, I feel, we have a significant advantage over the Soviet Union. However, within the constraints of not getting involved in anything classified, I am aware that the Soviets are certainly very rapidly working on this problem, because they see the need for developing their ASW capability.

In a very general, unclassified way, can you give us any indication of Soviet developments in antisubmarine warfare?

### ASW CAPABILITIES

Dr. PERRY. I agree with all the statements you have made, Senator Garn, on ASW. The Soviets do not now have the capability to attack our submarines at sea. We had designed techniques for submarine detection which in perhaps 10 years' time could be deployed, which could pose a significant threat to their submarines at sea if they elected to do that.

We believe we are a good many years ahead of them in this technology; but we see them putting in a very substantial effort, and I think that it would be imprudent to assume that our submarines would still be eluding detection during the 1990's. It will be a measure-countermeasure struggle continuously.

There will be no overriding vulnerability, but certainly the ability of both sides to detect submarines at sea is going to be improved substantially in the next decade.

Senator GARN. That is the point about which I feel very strongly, whether the SUM system is a viable system, and in this case it is not.

Given my personal experience as a former naval officer, I would not want to take the chance of putting this country in such a position, and I find it difficult to understand those who would put all their eggs in one basket and take a chance on the Soviet Union's not being able to develop their ASW capability.

Very briefly, on the SUM system in general, would you agree, without taking a lot of time to get into details on whether you can mount these massive missiles on the outside of small submarines—with the wave problem, stability, vulnerability, and the Van Dorn effect—that the SUM system is merely a concept at this time and that there have been no actual engineering designs, so that to put cost estimates on it is a very difficult thing to do for those who propose it?

Dr. PERRY. It is a concept. Neither we nor anyone else has detailed designs on it yet; therefore, any cost estimate for the system at this time is negotiable. We can put lower bounds on what the cost would be.

Senator GARN. Even though it is just a design concept at this point, certainly no engineering has gone into it, cost estimates are certainly not included by those who propose SUM for the additional number of basing facilities, maintenance facilities.

We are in a condition in our Navy now where we have operation and maintenance problems with our current fleet, we cannot meet the deployment schedules and so on.

### SUM COSTS

Is it true that none of these costs have been taken into consideration in the cost estimate, particularly the costs for reactivating bases and maintenance facilities and the costs for keeping these submarines operating and deployed, especially with the large number they are talking about, well over 100?

Dr. PERRY. Without commenting on other people's cost estimates on SUM, we have done estimates in my office and we have had the Navy do a cost estimate which took account of those facts, basing costs, manning costs, and so on. Understanding that there are still major uncertainties about the design of the submarine and what R. & D. costs will be, we still could come to a gross estimate of what the total system cost would be. We believe it would be about $30 billion.

It could be much more than $30 million, depending on factors which have to be evolved in the design of the system, which we don't know yet.

When you take into account the base, buying the missiles, buying the submarines, all the obvious factors in operating the system, it comes to about $30 billion.

### MX AND MINUTEMAN III COSTS

Senator GARN. Dr. Perry, Secretary Brown mentioned that the Minuteman III in 1980 dollars was more expensive than MX, yet at that time we certainly split deployed Minuteman II and Minuteman III in six bases. That certainly reduced tremendously the environmental impact at that time.

In terms of those costs, obviously a centralized location could have saved money and environmental, socioeconomic impact at that time. If that were the case for Minuteman III, why has there not been more consideration of split basing for MX?

Dr. PERRY. There is consideration of split basing for MX, Senator Garn, and the environmental impact statement which will evolve at the end of the year will lay out the split alternative, basing the system over four States.

I think the response, if it is analogous to things done with Minuteman, is that it will turn out to be substantially more expensive.

I think our responsibility will be to lay out those expenses and present them to the Congress; and we will do that.

### STATE PRESSURE FOR SPLIT DEPLOYMENT

Senator GARN. Isn't it true, however, that without a considerable amount of pressure, not only from Utah and Nevada, but from the Utah and Nevada congressional delegation, that split deployment was not a serious consideration until we started asking for consideration of it? All of the testimony I have heard for a long, long time in two different committees was that it was not seriously being considered, and privately I have heard that as well, until the last few months.

Dr. **Perry**. I will give you my own opinion about that, Senator Garn, although I have not been personally the one who worked on the environmental statement.

I have discussed it at great length with people who did. You might ask Secretary Chayes that when she talks this afternoon.

Senator **Garn**. I will.

Dr. **Perry**. From the beginning, we have recognized that the environmental impact statement would have to comply with the legal scoping requirements, and my judgment and the judgment that I deduce Secretary Chayes is talking about is that that means we could not arbitrarily rule out locations. The only ones we could rule out from consideration were ones for geological or technical or operational reasons.

Therefore, from the beginning, I believe, and I think it is true also that Secretary Chayes believed, that that statement would have to include all alternatives which could not be ruled out by one of those factors.

We have seen no basis for ruling out, for example, the high plains area of Texas and New Mexico; therefore, we have cost reasons for not wanting split basing, but from an environmental point of view, we have the responsibility to lay those out and will.

### MISSILE DEPLOYMENT IN WYOMING

Senator **Laxalt**. Has Wyoming been ruled out?

Dr. **Perry**. Based on geographical considerations alone, a combination of bedrock and water table and mountainous considerations, we believe at best we could get 20 to 30 missiles deployed in Wyoming.

Senator **Laxalt**. If we are talking about above-ground shelters, how is that even relevant?

Dr. **Perry**. The shelter construction goes down. I can't think of the number of feet, Senator Laxalt.

Senator **Huddleston**. We will now turn to Ms. Chayes, Under Secretary of the Air Force.

### REQUIREMENTS FOR SHELTER

Senator **Huddleston**. Ms. Chayes.

Ms. **Chayes**. You need 50 feet with no water and no rock.

Senator **Laxalt**. For your footings?

Ms. **Chayes**. Yes. In order to build the shelter, it is 150 feet if you go vertical; 50 feet down for the horizontal shelter of any design.

In addition to that, whether one has a racetrack or a grid or linear or whatever, you cannot have an inside slope of more than about 5-percent grade or the transporter will not work as efficiently. Those environmental characteristics exist in only a very small part of Wyoming.

In addition to that, you have possible coal deposits in Wyoming that rule out many of the areas that would otherwise be acceptable.

Dr. **Perry**. I might mention one other factor, Senator Laxalt:

One of the requirements of our deployment is that while we concede the single warhead could destroy a single shelter, we do not want to lay it out in such a way that a single warhead could destroy two shelters. Of course, that dictates spacing between shelters, how much concrete we would still put on them. That also determines the ground composition that affects that too, the way the shock waves are propagated through the ground. That is another factor which goes into the consideration.

Senator Garn. You testified earlier today that the changes that have already been made would save in excess of $2 billion. With that saving, are there not some offsets as far as remaining close to the original cost estimate if a decision were made to go to split deployment. I hope you would consider the fact that the changes you have already made would save some money.

Do you see any great technical difficulties with split deployment?

Dr. Perry. We are still examining that, Senator Garn, but none of the analyses I have seen so far pose any unsolvable operational problems.

### AIRBORNE COMMAND AND CONTROL STATIONS

We do have a different problem. We have to increase the amount of airborne command and control stations in order to communicate with two different locations. But that can simply be translated into the cost of the system; it is operationally more difficult, but we know how to solve those operational problems. It just takes more investment.

Senator Garn. I would suggest that I am sure split basing will cost more, but then we have to take into consideration some of the intangibles that I was speaking about, specifically the socioeconomic impact on one area of the country. It seems to me that, in debate on the floor of the Senate over the years with respect to the Clean Air Act, Clean Water Act, population densities and all that sort of thing, my colleagues have normally taken a position of trying to minimize impacts of this kind.

We have spent unbelievable amounts of money on various programs, billions and billions of dollars, to minimize socioeconomic and population growth problems.

I would suggest that this is something we must also look at in the case of MX. When we say, well, maybe it costs *x* number of dollars, $4 billion more for split deployment, we still need to ask how that will lessen the impact on two States by spreading it around. You cannot always put just a dollar cost on that, as evidenced by many actions in many other types of legislation this Congress has passed.

It is past noon and I have many other questions, but as with Secretary Brown, I would be happy to submit them to you for the record. I want to thank you most of all for your shortest answer, that, "Yes"; it was very refreshing to get that kind of direct answer to a question we have been trying to have answered for several weeks.

Senator Huddleston. Thank you, Dr. Perry.

### SUBCOMMITTEE RECESS

The subcommittee then will be in recess until 2 o'clock this afternoon.

Dr. PERRY. Thank you.

[Whereupon, at 12:10 p.m., the hearing was recessed, to reconvene at 2 p.m. the same day.]

(AFTERNOON SESSION, 2:20 P.M., TUESDAY, MAY 6, 1980)

# DEPARTMENT OF DEFENSE

## DEPARTMENT OF THE AIR FORCE

## RESEARCH, DEVELOPMENT, AND ACQUISITION

**STATEMENT OF HON. ANTONIA H. CHAYES, UNDER SECRETARY OF THE AIR FORCE**

**ACCOMPANIED BY:**

**LT. GEN. KELLY H. BURKE, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT AND ACQUISITION, USAF**

The subcommittee met at 2:20 p.m. in room 1114, Everett McKinley Dirksen Senate Office Building, Hon. Paul Laxalt (acting chairman of the subcommittee) presiding.

Senator LAXALT. We will be in order.

I want to apologize to the witnesses and those others present. We were held up by a vote.

I understand Ms. Chayes and General Burke are prepared to make some preliminary statements and after that we will proceed with some questions. Please proceed.

### MX SYSTEM AID TO ALLIES

Ms. CHAYES. I do not have a prepared statement. I would like to cover many of the issues I know are of concern to you and then respond to questions.

I would like to start by quoting from a letter by the President to Chairman Price on May 1. I will quote a few of the paragraphs and introduce the entire letter into the record if I may.

The President stated after thanking the chairman for his letter and I quote:

> First, MX is needed not just to preserve our own national security but also to preserve the security of our friends and allies. We depend upon them to help maintain an adequate balance of conventional forces and they must depend on us to maintain an adequate balance of nuclear forces.
>
> Second, while the MX system we are pursuing remains the best choice even without SALT, I believe the SALT process will continue. Thus, you should not lose sight of the positive impacts that MX will have for that process. It will demonstrate to the Soviets that their pursuit of strategic superiority is fruitless; it will set a good precedent with respect to verifiability for mobile ICBMs and it would allow reductions in the numbers of launchers without reducing survivability.
>
> MX does involve sacrifices, but defending our freedoms always has. Deterrence works for all of us or for none of us. As an appreciation of these basic facts increases, and as we identify and put into motion specific plans for dealing with potential adverse impacts, I expect growing support from the likely deployment areas.

[The letter follows:]

THE WHITE HOUSE
WASHINGTON

May 1, 1980

Dear Chairman Price:

I appreciate your letter in support of the MX - MPS missile system. I think all the points you make are excellent, though I would add two more.

First, MX is needed not just to preserve our own national security, but also to preserve the security of our friends and allies. We depend upon them to help maintain an adequate balance of conventional forces, and they must depend upon us to maintain an adequate balance of nuclear forces.

Second, while the MX system we are pursuing remains the best choice even without SALT, I believe the SALT process will continue. Thus, you should not lose sight of the positive impacts that MX will have for that process. It will demonstrate to the Soviets that their pursuit of strategic superiority is fruitless; it will set a good precedent with respect to verifiability for mobile ICBMs and it would allow reductions in the numbers of launchers without reducing survivability.

As you know, last week I sent several of my most senior officials to Utah to explain the need for MX and to discuss ways to fulfill my recent pledge to minimize the adverse environmental and economic impact of MX deployments in that general area. These efforts will continue.

MX does involve sacrifices, but defending our freedoms always has. Deterrence works for all of us or for none of us. As an appreciation of these basic facts increases, and as we identify and put into motion specific plans for dealing with potential adverse impacts, I expect growing support from the likely deployment areas.

Again, I appreciate your letter. I hope you will make it -- as well as this response -- part of the record of your upcoming hearings on the MX program.

Sincerely,

Jimmy Carter

The Honorable Melvin Price
U.S. House of Representatives
Washington, D.C. 20515

### RESTORATION OF ICBM SURVIVABILITY

Dr. Perry and Dr. Brown stated the need for Triad and also the need to assure the survivability of our land-based elements, and I do not plan to repeat that this afternoon.

The question of how to restore ICBM survivability as Dr. Perry pointed out has been a subject for 9 years of intense study; 30 different basing options were examined in detail. He covered the road mobile; the deep underground silos; the ships; the small submarines.

### MULTIPLE PROTECTIVE SHELTERS

In reaching the multiple protective shelters, he also stated that it best meets the complex and difficult requirements of survivability, affordability, verifiability with the minimal environmental impact possible. He reviewed again the best of the MPS concept is the horizontal shelter and explained further that the mobility features of the horizontal MPS make it superior to the vertical shelter which the Air Force had stated earlier was the preferred option.

While the vertical mode is slightly cheaper it lacks mobility and therefore that redundancy in addition to concealment to obtain survivability.

The original horizontal dash system exploited mobility to the fullest extent incuding a shelter to shelter automated dash.

During the last 9 months OSD, the Defense Science Board and the Air Force have examined the system in detail and concluded that the shelter-to-shelter automated dash could be eliminated. It does provide a marginal military capability but in exchange for cost and technical complexity which makes it not that desirable.

This opened the door to a transporter with a separable missile erector launcher which resulted in a smaller shelter; elimination of separate mobile surveillance shields since the transporter acts itself as a shielding vehicle; and the ability to develop a high-fidelity mass simulator which increases the ability to conceal the system.

While it will require a few weeks now to conduct precise design tradeoffs between the transporter, the mobile erector launcher and shelter, we are confident the system costs and resource requirements including materials and manpower will be reduced.

This design refinement provides the means to exploit the mobility characteristics of this system in the unlikely event that concealment is compromised.

As explained earlier we cannot reshuffle all of the 200 launchers among all of the 4,600 shelters in less than 12 hours. We can dash some number of transporters containing missiles or simulators from the road or special maintenance facility to the nearest shelter in less than the flight time of an SLBM, and this dash is concealed.

The elimination of the automatic dash also provides the opportunity to explore different road designs for the shelter clusters—the linear road with 23 shelters. This is a more efficient design since it would permit deployment of more shelters in most valleys while eliminating on the order of 1,000 nautical miles of road.

We are performing detailed studies to determine the most efficient as well as the least environmentally intrusive road designs. Overall, we feel this design represents the sum of the thinking that culminates in the best basing mode.

The Air Force is in total agreement with OSD and the Administration on this issue.

### SPECIFICS ON ENVIRONMENTAL IMPACT

I would like to turn to specifics about the environmental impact and what we are doing to understand, analyze, and mitigate those impacts.

I would like to place the impact of the MX system into perspective because I think it has been somewhat blown out of proportion. We are talking about an overall area of about 30,000 square miles if you were to draw a string around the entire deployment area. In comparison, Minuteman is around 95,000 square miles in seven States.

Based upon our definition thus far, and this will not change because of our design requirements, land to be withdrawn will be 25 square nautical miles, which in perspective is two one-hundredths of 1 percent of the total land area in Nevada and Utah or one one-hundredth of the Great Salt Lake.

The amount of water required for MX should also be put into perspective. During construction the water needs in any one valley would be 2,500 acre-feet. In operating a support base, one of two, would need about 13,000 acre-feet in operation. Perhaps 1,000 less than that for the loading dock.

That 6,000 acre-feet is about 75 or 77 percent of the water used each year in Carson City, Nev.

Similar comparisons can be drawn for construction materials. The MX construction will use about four-tenths of 1 percent of U.S. cement production and only about two-tenths of 1 percent of steel production. There will be a phenomenon of large numbers of construction workers, but again that should be put in perspective.

We are talking about 35,000 direct workers in the peak construction years and perhaps 30,000 indirect. This can be controlled by policies of the States. We are talking about 7 percent of the labor pool of Nevada and Utah. In the direct steady state we are talking about 14,000 workers. This can be controlled somewhat and it is spread among two States.

The picture I want to get across is, while large the MX system even in peak construction years will not be unmanageable. I believe sound planning on the part of both the Air Force and State and local governments will allow production of the system with minimal adverse impacts and with a potential for positive impacts.

### WATER REQUIREMENTS

When I speak about positive impacts I am speaking about what the States would learn about their resources and particularly water resources, which are not known in most of the valleys considered for deployment. I am talking about the development of water resources that are too expensive for commercial users to develop now.

This means that more water is likely to be available for grazing and mining. Furthermore, mining or exploration for mining should be enhanced by the development of the infrastructure that would inevitably accompany construction of the system.

## PERSONNEL

In terms of controlling the number of construction workers, we are committed to responsible innovative planning in the construction as well as in other phases of the system. We are going to do what we can to phase and reduce and control by location the worse effects of such an influx over such a short period of time of so many workers. I think we are developing with the States the capability and experience to do really good planning together. We are including States now in our conceptual base design effort and we will seek their suggestions for the location of the support bases.

We have begun to develop close relationships in working with the States to allow for early comment and input into the environmental impact statement because comment even on a finished draft is going to be difficult.

It is a varied environmental impact statement. It will be long and cover many areas. These areas of interest have been developed in part through the scoping process and the many meetings we have held.

It has been questioned whether we would be able to complete an environmental impact statement in the time allotted considering the complexity and scope of the document.

I think I can lay these doubts to rest. Barring anything unforeseen in the way of court injunction—which I do not expect and I will get to that later in the questioning. I do expect litigation, but I do not expect litigation at this point.

We can meet our schedule as set forth and at the same time meet legal requirements of EPA and the other regulatory acts. I say this with a certain measure of experience because the Air Force has been involved in other complex weapons systems and base closure environmental impacts statements. We have already completed two statements for the MX and the Milestones II environmental impact statement was certaintly as complex as the one we are preparing now.

I would say there are other schedule problems that really present some questions and those are really in the hands of Congress. The next major hurdle after completion of the environmental work would be the process of withdrawing public lands should the decision be made to select Nevada and Utah for all or part of the deployment area.

What we have to face is a single session of Congress in which the legislation under the Engle Act and the Federal Policy Management Act would have to be completed.

We feel that is possible with cooperation. Thereafter we think the construction could proceed on schedule and we foresee no technical problems that would prevent us from arriving at an initial operating capability in 1986.

## ALTERNATIVE DEPLOYMENT AREAS

Two other questions that were raised this morning were whether we are in fact analyzing the possibility of split basing or an alternative deployment area. That work is well along and will be included in the environmental impact statement.

I would like to state I am not sure at this point whether certain operational problems as well as cost problems may cause us to question the viability of the second area of the southern high plains of Texas and New Mexico. My tentative conclusion based upon the information that I have thus far is that the southern high plains area is probably a legally reasonable alternative, both in operational terms and in cost terms. It is borderline on both scores.

It would require us to move from 5,000 to 8,000 people out of the deployment area, and while large dam projects have done that and accepted that kind of environmental impact, it is something that makes it considerably less desirable than the Nevada/Utah area where essentially no people would have to be moved.

The costs are also well in excess of deployment in Nevada and Utah in part because of land purchase and in part because of other factors. The split basing cost is even more because of the requirements of communications and activity.

Nevertheless my tentative conclusions—and I think those of the Air Force and they are tentative only—are from a legal perspective of inclusion in the environmental impact statement. It is worth going through all of those facts so they will be available to you.

### ENVIRONMENTAL IMPACT GAINS

The final question I would like to deal with is any gains in the environmental impact by moving from the baseline system to the loading dock system and moving from a loop system to some sort of a linear system. I think there are some environmental advantages. They really boil down to a 20-percent reduction of the land areas. What we are talking about over the baseline system with 7,000 would be a reduction from some 50 to perhaps 35 valleys.

On the other hands, the impact within a valley from this tighter packing of the system could be more adverse, but we would have greater flexibility to avoid those valleys where the impact on water or endangered species might be worse. There also would be a reduction in the number of construction workers, perhaps 15 to 20 percent. I do not want to be pinned down on the numbers now because they are tentative.

We are just really beginning to look at it hard. That is the kind of order of magnitude we are talking about.

In sum I can support what was said by Dr. Brown and Dr. Perry that the environmental impact of this design refinement is a definite net plus.

That covers the areas I wanted to speak about. General Burke may want to add something. We are both available for questions.

Senator Laxalt. Thank you. General?

General Burke. No, sir. I think I will wait for the questions.

### TIME FRAME FOR COMPLETION OF EIS

Senator Laxalt. I thank you, Ms. Chayes. I am going to direct my questions principally at the impact problem. I think in connection with the weaponry and the system and so forth we covered that adequately this morning.

You have indicated that of the steps required to get this moving forward first of all obviously is the EIS. What is the time frame you presently have for the completion of the EIS and what exactly is involved in that process?

Ms. CHAYES. We now expect to complete a draft EIS some time in the summer, perhaps July. We then would expect to conduct the hearings and obtain comments over a period of 2 months or perhaps longer with an extension. We would then incorporate the comments and aim for a final draft at some time in the fall, perhaps November.

I think there is a resting time of 30 days before one can move on.

Senator LAXALT. What exactly is going to be involved in the EIS? What are we going to be looking at?

Ms. CHAYES. We will be looking at every conceivable relevant impact. We will be looking at the impact on water resources. We will be looking at the impact on flora and fauna and people and their occupations, the socioeconomic impact on their jobs.

We will be looking at air quality. We will be looking at all of the other pollution areas; pure water. We will be looking at toxic substances released into the air and even noise pollution.

Senator LAXALT. Who will be doing this work?

Ms. CHAYES. The Air Force is responsible for the environmental impact statement and is working through contractors and our own staff and various commands.

Senator LAXALT. Have you already signed contracts for this work?

Ms. CHAYES. Yes. The major contract not only has been signed but we have used the same contractor through all of the MX process. Many of the subcontracts are in the process of being done; have been signed. Some of the subcontracts which involve some of the final field studies in the basing area are still under negotiation, but these are minor validating subcontracts as I understand it.

### PRINCIPAL CONTRACTOR

Senator LAXALT. For the purpose of the record, what is the name of the principal contractor?

Ms. CHAYES. It is H.D.R. Ecosciences.

Senator LAXALT. Where are they based?

Ms. CHAYES. Santa Barbara.

Senator LAXALT. Do you know offhand roughly how many subcontractors are going to be involved in the EIS?

Ms. CHAYES. I would say 8 to 10.

Senator LAXALT. Are we at the point where they are actually working now?

Ms. CHAYES. Some are. I want to tell you the water is being done by a different contractor named Fugro, International from Long Beach, Calif. They also have some subcontractors. Between the two some subcontractors are onboard and some are now under negotiation. Many of these are in Nevada and Utah.

Senator LAXALT. We have left racetrack and now we are going linear. Will the environmental impact studies be geared to that type of road system rather than the other?

Ms. **Chayes.** That road system was studied previously in the Milestone II EIS. We have made provisions in the EIS for various design changes in any case. We have been studying, because of the Stevens amendment, several variations, and the answer is "yes, it will not make an enormous difference."

The main difference is the one I mentioned in my opening statement which is that the impact on any one valley of a linear system is likely to be more intense because there will be more shelters. It will be more tightly packed.

Senator **Laxalt.** Is this predicated on Utah and Nevada getting the full system?

Ms. **Chayes.** That is the preferred option, but the studies will also include the southern high plains, both as a full deployment area and a partial deployment area under a theory of split basing.

### ENVIRONMENTAL IMPACT ON SPLIT DEPLOYMENT PLAN

Senator **Laxalt.** Will we have available to us the environmental impact upon respective States in the event we work out a split deployment plan?

Ms. **Chayes.** Yes, to the extent that we analyze a split basing plan, the impact on all the States encompassed by the system would be analyzed equally. They do not change by a factor of 50 percent. The impacts are more variable than that. They are more complicated than that.

Senator **Laxalt.** When this study is completed this summer will we have enough data to evaluate the impact upon our respective States of having the full 200 missiles as opposed to say one-half of those?

Ms. **Chayes.** I should think we will have a satisfactory draft which deals with all of those questions. If there are questions unanswered in the draft EIS, which those including yourself would want to see addressed, that is the purpose of having a draft and having the questions answered or comments incorporated in the final. If they are not addressed to your satisfaction then we have that time to correct it.

Senator **Laxalt.** You hope to have this first statement completed by midsummer? That is just a few weeks from now. Are you that far along?

Ms. **Chayes.** I think it is more than a few weeks from now.

General **Burke.** By July, sir.

Ms. **Chayes.** That is over 2 months. The answer is "Yes."

### COMMENT PERIOD ON THE DRAFT EIS

Senator **Laxalt.** There has been some concern expressed by our Governor in Nevada and some of our other local officials that the comment period once they have the statement in hand is too short. We are talking about 60 days. Is that your present schedule?

Ms. **Chayes.** Yes. We are meeting the statutory and regulatory requirements. We will extend that somewhat. Sixty days is an extension over the normal requirements under the regulations.

The States are developing the expertise through the planning funds that we managed to secure for them in the military construction bill. They have available to their experts a great deal of the material in advance and therefore the time period really should not be looked at as merely starting from the draft.

Senator Laxalt. You are saying really the time period at least in terms of input is ongoing and will be in front of whatever time period we establish later.

General Burke. Yes, sir. We have already furnished the States various reports as they come in. As quickly as we get them we pass them on.

Ms. Chayes. We are especially anxious that they look at the various models that we have done—from socioeconomic modeling to air quality modeling—to make sure that they feel these are the best of a variety of models. It is really a matter of technical professional judgment.

They need to be comfortable with that. Once that has happened they can put in a number of different assumptions to run the figures that way. They are in the process of doing that.

## EXTENSIONS FOR COMMENT PERIOD

Senator Laxalt. Can we rely upon reasonable extensions if we need them this summer?

Ms. Chayes. We are prepared to grant as much in the way of extensions as will not delay the IOC. We really have to work backward from 1986. We feel we must introduce the legislation to withdraw land assuming we are talking about all or part of the system in Nevada and Utah.

Senator Laxalt. I gather that you are gearing this so we would be moving on legislation I gather the first of next year?

Ms. Chayes. January 1981. That means the EIS plus the 30 days sitting period has to be completed by the beginning of 1981.

## LAND WITHDRAWAL PROCEDURE

Senator Laxalt. Let's discuss the land withdrawal procedure. You indicated in your testimony that it will require legislation. Is that correct?

General Burke. Yes, sir.

Senator Laxalt. How specific will that legislation have to be? Will we know when this legislation is presented to us by you people precisely the number of acres involved and precisely where those acreages will be on the ground?

Ms. Chayes. That is standard BLM procedure. They describe it by the legal descriptions on the maps.

Senator Laxalt. Those will be in 2½-acre increments?

Ms. Chayes. We will probably withdraw a larger area allowing for the exact 2½ acres to shift or we will identify a larger area but withdraw only the 2½ acres. We are working out a procedure now with the BLM whereby we can identify a larger area within which the 2½ acres will be withdrawn.

If borings show minerals, we can move within that block to the 2½ acres. Under the existing laws that only 2½ acres would be withdrawn but a larger area might be identified. At no time would we withdraw more than the exact 2½ acres.

Senator Laxalt. These studies are geared in conformance with the understanding that we had this morning to the effect that outside the

2½ acres once we establish that fence, the rest of the land will be freely available to the public.

Ms. **Chayes.** Absolutely. The whole system is predicated on that point. The shelter area and the main operating base is the only withdrawn land.

Senator **Laxalt.** The net amount of land that is going to be withdrawn from our respective States will be what again?

Ms. **Chayes.** Twenty-five square nautical miles actually withdrawn; another some 80 square miles in roadway that would be easements and shared use.

Senator **Laxalt.** When the land withdrawal proposal comes to us we are looking roughly at 105 square total miles of withdrawal from our respective States?

Ms. **Chayes.** No; only 25 square nautical miles.

Senator **Laxalt.** You are talking about 85 on the roads?

Ms. **Chayes.** Yes; those will be easements. That will not be land withdrawn.

Senator **Laxalt.** I suppose it could be used for other purposes.

Ms. **Chayes.** That is right.

Senator **Laxalt.** I gather the public would be free to use these roadways if they saw fit.

Ms. **Chayes.** Yes.

General **Burke.** They would be and I expect they would make good use of it.

Senator **Laxalt.** The only area the public would be precluded from using at all would be the actual fenced area of the 2½ acre parcels?

General **Burke.** Yes, sir. That is consistent with what we have been doing for 20 years with the Minuteman.

Ms. **Chayes.** That is one-one hundreth of the Great Salt Lake.

Senator **Laxalt.** The concern has been this was a foot in the door, nose of the camel under the tent and what we would be looking at eventually would be a withdrawal of 25,000 acres in terms of security considerations later. That is why we want to make absolutely sure the security consideration is tied into this and we can go back to our people and say rather than 25,000 square acres we are only talking about a fraction of that amount.

General **Burke.** Senator, we have had excellent success with our Minuteman security system for 20 years and that was done with the technology of that era, the sensors and the warning systems that we had available then.

### SECURITY CONSIDERATIONS FOR MX

Senator **Laxalt.** Are the security considerations for MX quite a bit different then they are for our Minuteman?

Ms. **Chayes.** No; not really. I think Dr. Brown made a very important point this morning. He said that he would be amenable in principle although he wanted to see the language of confirming that undertaking in the authorization bill.

I think that is certainly a strong statement or our intent. The second assurance is we could not control any more land than the land we withdraw without going through the same procedures before the appropriate Interior Committees with respect to any other land.

There is no way we could control access to additional land without withdrawing that land. We would have to go through that very same procedure that we are going through for the 25 square nautical miles.

### WATER REQUIREMENTS

Senator LAXALT. In terms of the water, are you far enough along to know whether you are going to be going to ground water mainly or surface or both?

Ms. CHAYES. I think it is pretty clear we will be relying on ground water.

Senator LAXALT. Exclusively? We are looking at wells exclusively in the development of water for this project?

Ms. CHAYES. By and large I think the answer is yes. I think we have done about one-third of the experimental drilling that we planned to do. I think we have identified resources that are going to provide plenty of ground water and renewable ground water for the project.

We expect that 90 percent of the valleys will have sufficient unused unappropriated water for construction and at least 30 percent of the valleys would be expected to have sufficient unused water to support the bases. There are only two bases.

We are talking about 12,000 to 13,000 acre-feet a year during operations. Railroad Valley has something like 4 to 6 million acre-feet a year.

Senator LAXALT. You are able to safely drop these wells without affecting the existing water supply in any of those valleys? You are satisfied with that?

Ms. CHAYES. We are are satisfied with that. We might have to make some adjustments in certain valleys where the yield is not what we would expect but because we have that flexibility to move from one valley to another it will not present any operational problems once we know for sure what the water resources are.

That is the reason why we need some flexibility in the exact withdrawal of the 2½ acres because we might identify a particular site and later find we needed to move all or part of it or that valley could contain less of the clusters than we thought.

Senator LAXALT. Are you negotiating now or do you plan to negotiate for any of the ranch water in any of these valleys?

Ms. CHAYES. We do not feel at the present time that will be necessary at all. We have been offered water by some of those who own the water rights. We have felt that is sort of good to know that people are available in both States. Were that to be required in any area, our preference would be to lease.

We do not foresee even the need to lease in the steady state. The only thing we could possibly foresee would be leasing water rights during the construction period. We have no evidence that will be required.

Senator LAXALT. You do not have any problem I hope any more than the witnesses this morning did of having the States exercise complete control over the appropriation process of the water?

Ms. CHAYES. In terms of following State law both procedural and substantive? No. That has been a policy statement by the President.

Senator LAXALT. The final determination is whether the water would be available and how it would be eventually put to beneficial use and whether it would be left solely in the hands of the State. That is fundamental.

Ms. **Chayes.** We have no problem with it because we feel whatever case we can make will be sufficiently persuasive to these very professional water engineers. We have been dealing with them in the process of exploration now.

Senator **Laxalt.** In the event of a conflict between your pros and the States, the State would control?

Ms. **Chayes.** Yes. It is their determination under their procedures.

### WORKER IMPACT

Senator **Laxalt.** Let me discuss worker impact and then I will turn it over to Senator Garn.

You have indicated some numbers depending on peak periods and you are looking at 35,000 direct workers. What is a "direct worker"? Is that someone actually on the construction site?

Ms. **Chayes.** We are talking about construction workers directly associated with the job. We are talking about workers who would be working and operations as we began to develop the activation and check out facilities and so on. Those are all people directly employed by the project one way or another.

### CONSTRUCTION TIMEFRAME

Senator **Laxalt.** When do you hope to start construction?

Ms. **Chayes.** We would hope to start construction in 1982.

Senator **Laxalt.** You are satisfied as the witnesses this morning that you are not going to run into any undue environmental legal hurdles?

Ms. **Chayes.** The only legal problem that would cause a time delay is an injunction that was affirmed by a Court of Appeals Judge. Any other litigation and we do expect litigation—every one of these large systems whether defense related or otherwise has been litigated—but that litigation goes on at the same time as the construction unless there is an injunction.

Senator **Laxalt.** Your lawyers tell you when the injunction is applied for that there will be no permanent injunction interfering with the construction until the matter is finally disposed of? Is that what your attorneys tell you?

Ms. **Chayes.** That is a judgment arrived at by myself and the General Counsel's Office of the Air Force.

Senator **Laxalt.** That has been your experience in other comparable areas?

Ms. **Chayes.** That has been our experience by and large. We have had temporary injunctions which we have managed to dissolve in a matter of weeks on some projects, particularly with base closures.

We believe we would go to a trial on the merits of the adequacy of the EIS and that is really the only grounds for an injunction. I think because of the importance of the project and because of the nature of the EIS we would go to a trial on the merits and we would prevail. In sum that is our best legal judgment.

Senator **Laxalt.** Do you have any signals from the major environmentalist groups like Sierra or NRDS that they are going to pass?

Ms. **Chayes.** No; the indications from the beginning and not just from the environmental groups but other groups that are really against the system are they are going to team up together to try to stop the system.

Senator **Laxalt.** What are we looking at in terms of total years to begin this project and complete it on the basis of the present 200 missiles and the shelters?

General **Burke.** We would be completing it in 1990, starting in 1981.

Senator **Laxalt.** We are talking about 7 full years. What are we looking at in terms of peak periods within that 7-year framework?

General **Burke.** The number Ms. Chayes gave of 35,000 is the peak number. That is the high side of the estimate. There are a number of contractors who think that is quite a bit more than what actually would be required. In the steady state it will drop down to a workforce of about 12,000.

Senator **Laxalt.** That will be primarily Air Force people?

General **Burke.** Air Force, military and civilian. We would have as many civilians as we could.

### PLACEMENT OF WORKERS FAMILIES

Senator **Laxalt.** What are we going to do in eastern Nevada and western Utah with 35,000 construction workers and their families?

Ms. **Chayes.** They would not all be in one place. We are not sure there will be families. Experience shows there would not be families for all. They would be distributed throughout the entire deployment area. Many of them would be confined construction camps. Some of them would certainly swell the size of the smaller areas. Some of them would be in the larger cities such as Salt Lake City or Las Vegas.

Senator **Laxalt.** Are we going to be building all these shelters at once or is there any program developed yet as to how this project is going to be completed?

Ms. **Chayes.** It would start in both areas I believe. It would be phased. We are talking about workers of about 2,000 in 1982 moving up to about 5,700. These should change. If they change they should change in the direction of the last stages. We are working on techniques of phasing and prefabricating and so on. That would be from 1983 to 1984 with a big jump to over 12,000 and in 1985 to perhaps 18,000 or 19,000 and in 1986 which is the beginning of the 3 peak years to close to 30,000.

You have operating workers at the same time as you have construction workers. That brings the level up.

As General Burke pointed out, we are giving the least optimistic of the figures because we want to measure the worse case impact.

Senator **Laxalt.** Is there going to be any policy on the part of the Air Force or anybody else in terms of discouraging families from coming in during the construction phases so that we lessen the impact upon our schools?

General **Burke.** Yes, sir. I think that is subject to management. I think it is consistent with the way large construction projects have taken place in this country over the years.

We consulted with Bechtel who is one of the biggest and most successful in the world. We are consulting with others. Bechtel's report said if they had the job of constructing these shelters they would have a standard contract with all their workers. They would have a single labor agreement. They said they would need on the order of about 12,000 people because they would work them very long hours. They would work typically a 60-hour week and they would set up work camps.

Senator Laxalt. This is during peak periods?

General Burke. Yes.

Senator Laxalt. We are talking about the period of 1985 to 1987?

General Burke. Yes, sir. This is a low number. They said they would set up on the order of six work camps and as part of the terms of employment they would provide free room and board and they would work a 10-hour day 6 days a week.

The typical pattern in most cases is construction workers will save up those days off and they will work 3 to 5 weeks without a day off and then they go home and visit their family.

They said under those circumstances they would estimate that on the order of 300 to 400 would bring families with them and they would likely put them in Salt Lake or Las Vegas.

Senator Laxalt. Is there anything we can do about building this into the contract instruments so the people out there are protected?

General Burke. Yes, sir. I think it is in all of our best interests to minimize that.

### DESCRIPTION OF CONSTRUCTION CAMP

Senator Laxalt. What would a construction camp consist of? Are we going to put some instant barracks out there?

General Burke. I think it will be largely trailers with a dining hall and recreational facility.

Ms. Chayes. We have experience with that sort of thing in Saudi Arabia and now in Israel building the bases. I plan to go in the next few weeks to look at those particularly in Saudi Arabia. The self contained camps have worked very well. In both of those countries there have been foreign workers so the impact was even more worried about then it would be Nevada or Utah.

This can be done. We have mobile construction camps. They are self contained and have some recreational facilities. And there are restrictions.

On the Alaskan Pipeline a restriction was made that nobody could come with guns or off-road vehicles. They could not go hunting and fishing and have other adverse impacts on the environment.

Senator Laxalt. I have some other questions but I will let Senator Garn take over.

### IMPORTANCE OF IOC

Senator Garn. General Burke, first let me ask you a question that is more of a military nature. We are constantly talking about the IOC being so important.

It is my understanding we are going to have only 10 missiles in place by the IOC date of 1986. As we discussed this morning, I feel we are a couple of years behind now, and it is certainly not my intent to delay

MX in any way. I was one who thought we should move much more rapidly, as you well know.

Is not the total operational capability far more important than the first 10 if we look at possibilities of attack? If I were a Soviet planner obviously my first choice for an attack would be during the period of maximum vulnerability when we just have the Minuteman and do not have any MX's. My second choice would be during that early initial construction phase. Is not total operational capability the more important date?

General **Burke.** I think the full operational capability is the more important of the two dates and that is 1989 and it is to some degree geared to the initial operational capability.

I think there are several important aspects to the initial operational capability. First, from the very beginning, it does put the Soviets in a position where they would have an adverse exchange ratio even for those 10 missiles. That is not very much but it is a start in the right direction.

I think as a matter of national and international perceptions it is terribly important that we do not delay this program any further. It has been delayed already long beyond the point I think is safe and prudent and the consequence of that is as you alluded to that we do have a period in which the startegic balance is not what it should be, but unfortunately, the length of time of development and deployment of a major strategic system is such that is an accomplished fact.

We are just going to have to live with that and that is the product of decisions that were made or not made in years gone by. The country is going to have to cope with it. It is going to be a less easy time than the one we are currently in and it is not all that easy now.

### DECISION DELAYS BY DOD

Senator **Garn.** I understand. My obvious frustration, is as one who tried to push a decision through amendments requiring the Department of Defense to make a decision. It became a little frustrating when we could not get the administration to move for more than 2 years.

Nevada and Utah are now, all of a sudden, going to have it crammed down their throats in a very compressed period of time. I understand what you are saying, and I agree. I do not want the operational capability delayed 1 minute longer than it has to be.

On the other hand, we are making decisions that are going to affect our States forever, and cause a major change of lifestyle there. I wish we had made the decision on whether to build the missile much sooner so we had more time to consider these items more carefully.

Secretary Chayes, let me make a point which I made this morning to Secretary Brown. You have learned the system very well over the months and have put a great deal of time into it. I appreciate your cooperation. You have lots of statistics.

I am not sure it is too relevant that the MX impact is only 7 percent of the workforce or 1 percent of the Great Salt Lake and so on. For those of us who have lived in rural, agricultural States like Utah and Nevada all our lives, I do not think you can measure those impacts by percentages of the Great Salt Lake or of the whole State population.

I am sure you have been in the areas to be affected by MX deployment. Certainly Secretary Perry has been there. As we are looking at some of those towns and counties in western Utah and eastern Nevada, I have seen some of these small towns in my State where a new business with 50 employees is a tremendous impact. You cannot imagine how the town responds to that type of employment and the increased job opportunities, but this also adds to the burden of the mayor of that town in handling 50 more employees.

I think I know something about that. I spent 7 years in local government as a mayor. I was president of the Utah League of Cities and Towns. I know most of the small town mayors. They get $50 a month if they are lucky.

My point is this, your comparisons may be more accurate if we were talking about putting it in the Wasatch Front. Hill Air Force Base is a much bigger base than either one of these you are talking about.

It is between Ogden and Salt Lake City. It is in a large population area. This is all relative. If we are talking about putting another base along the Wasatch Front, fine. It is no big deal. It helps employment. It has no great impact. It is not going to change my lifestyle or anybody else's who lives in Salt Lake City or Ogden or the general area from Brigham City to Provo.

I think you know that is where most of the population is, from Brigham City on the north to Provo to the south, and we have 24 or 25 counties that have less than 15,000 population. There are some counties that are bigger than Connecticut and Rhode Island and Delaware and New Jersey put together, and have about 10,000 people.

When you talk about these numbers and putting MX in those types of areas, it is an unbelievable impact compared to a metropolitan area. You can put something here in the Washington area and nobody knows it is here. Maybe that would be the best place. I say that facetiously for the MX. We could hide it in the traffic jams.

I just wanted to make the point very respectively that we are dealing with an entirely different area of the country than most people who have lived back here have ever envisioned. They cannot imagine driving mile after mile seeing nothing but a jack rabbit. They do not understand that kind of lack of population and lack of density and the lifestyle of most of our people in those rural areas.

I just wanted to make that point again as to what we are dealing with. I wish I could run more people out and take them on a tour. I happen to think Nevada is more desolate than Utah.

Senator LAXALT. That is arguable.

Ms. CHAYES. Senator Garn, I hope we have not come across as insensitive to these values. My use of statistics was really to try to correct some of the exaggerations on the other side.

There is no question but that the location of the main operating bases in whatever town, whether it is Delta or Milford, will transform that particular small town or city into something quite different. We are talking about a base area where there might be 10,000 to 12,000 people plus their families in a steady state.

What we are saying is, if you look at the statewide picture and if you look at the deployment, these wide open spaces used for grazing and mining and for some recreation as hunting and so on will still be available.

The overall deployment of the system will make some visual difference but will really not make that much of a difference except for these main operating bases. In truth we have accepted the notion of a somewhat higher cost for some operational advantages and definite environmental or socioeconomic advantages of having two main operating bases so that we would not impact any one State or any area right in the middle of the two States with a huge base.

There are some operational advantages because the system is quite farflung. It does reduce the impact on each State considerably. There is no denying there is a change. I guess the only thing we would say is with very careful planning together with the States and localities those impacts will not be all negative. Not every change will be a change for the worse.

I have been out in the deployment areas. I have talked to a lot of people including some of the mayors and some of the business people. One of the things I hear is people will be happy because their children will stay in the area and in the State where otherwise they would be attracted elsewhere because there were no employment opportunities possible. That means a great deal even if it does change their lifestyle somewhat.

Senator GARN. I do not mean to indicate there are not any advantages. I understand the fact there have been a lot of exaggerations—one of which is that virtually every valley west of Tooele would be filled with MX. That is ridiculous.

I want to continue to try to sensitize those of you who have not lived in that kind of an environment to those kinds of problems. I was born in a town of 3,500 in Utah. It is very hard for people in a large metropolitan area like Maryland and Virginia and Washington to understand what a different type of situation that is. I will continue to try to sensitize everybody to those unique impacts; statistics do not tell the full story of this kind of a base.

We get new businesses every day in Salt Lake, Ogden, Weber County. Everybody goes to cut the ribbons. Everybody is happy and bands are there. Placing that same business in one of these areas would cause considerable problems and changes and that is the only point I wanted to make.

In addressing these problems, I am certainly aware that there is not detailed information yet on the location of bases and the mode of deployment configuration and so on, but there are certainly a number of things, based on prior experience in these type of things, that we ought to look at immediately.

One of those is the matter of funding the socioeconomic problems and whether or not the Department of Defense or the Air Force is willing to try to fund all of these types of appropriations as part of the cost of MX, and if these funds are to be administered through the Department of Defense.

I am specifically referring to situations I have seen where communities have had to go through HUD, HEW and DOL. As a former mayor I know about that process. I know about the bureaucracy and the delays and the red tape.

Maybe one of the reasons I am bald is from tearing my hair out in working with the bureaucracy.

All of your assurances in the world to Senator Laxalt and me are not good enough unless we can get some commitments that the people who are making these decisions can also have some control over those funds and their distribution. Those mayors and county commissioners and the State and local officials cannot be allowed to bleed through years of working with the bureaucracy.

Ms. **Chayes**. There is no question that legislation will be required to work out a system where the States and the localities and counties will not have to come to the other agencies with supplements. Without legislation that would be the case.

I would tear my hair out as well.

We have a model of that legislation. We learned from it. That is the Trident experience in Bangor, Wash. It was not wholly satisfactory but it was really a very promising start.

In the planning phase funds can be appropriated to DOD as it was last year and I do not see any problem or any need to do otherwise.

The execution stage, the actual impact of funding of sewers and hospital beds and classrooms is most appropriate through the other agencies. The way one would avoid getting bogged down is to have clear earmarking for these areas and specific items in the budgets of those agencies.

### BLOCK GRANTS

Senator **Garn**. On a block grant basis?

Ms. **Chayes**. That would be sensible but it would be very hard when you are talking about grant and aid programs. You would find a great deal of resistance. This has to be worked out through the legislative process. Some of them could certainly be block grants. Some of them when you are dealing with criteria for construction of sewer pipes or whatever, my guess is you would have to meet the criteria and there would be no problem in doing that.

You would have to look at every bit of impact aid funds you are talking about. Furthermore I am sure there would be kinds of impact funds that do not fit into any other program that would have to be especially appropriated and that would be most appropriate in a block grant.

### IMPACT OF MX TOO DIFFICULT FOR COMMUNITIES TO HANDLE

Senator **Garn**. This is highly important, because if you do not have either earmarkings specifically for these kinds of projects, I will tell you what is going to happen. The impact of MX will proceed much more rapidly than the ability of the communities to handle it. They will still be waiting for the grant applications.

I have one full time staff member who was with me when I was mayor and has been with me for 9 years. About 75 percent of his time right now is spent on helping cities in my State with grants, filling out the forms, and going through the process. We are talking about months and years of dealing with this impact assistance issue. It is not going to help very much if we reach the IOC and the communities are still trying to work their way through the grant process.

I have not been too impressed so far with the organizational arrangements for the handling of MX, although we have the first million dollars out there.

Do you have any idea when this bill you are talking about will be submitted, and what kind of money we are talking about?

Ms. CHAYES. Congressman McKay has put forth legislation that would put in the authorization process the ability to do this, both the planning and implementation. I think that is very important.

I think the particular language he put forth, and I believe he agrees it needs some work, is the exact model of the Trident-Bangor language. I think it is somewhat too restrictive to accomplish the ends you are talking about.

I just want to say I myself have had the same experience as you. I was not the mayor. I was that staff person in Massachusetts who was responsible for securing those grants. The model cities notion came out of a memorandum that I wrote. I am responsible in some part for that legislation.

Senator GARN. You are really in trouble. I was chairman of the Model Cities Agency also.

Ms. CHAYES. We share the frustrations and essentially the lack of funds to do anything in a coordinated way.

I am also extremely concerned about the timing and particularly the early timing. I am very regretful of the fact that both Governors have chosen not to initiate the planning process for impact. They have been in effect setting up the structures. Both in the testimony before the House Appropriations Committee, and then repeated again in the first quarterly report that we have received on the expenditure of the million dollars, they have declined from participation in actual planning for what would be needed in 1982.

While we will be able either by reprograming or some other device to shift funds in the 1981 DOD budget for additional planning, we would need either authorization or we would need something in the appropriations bill to do that. I think that will not be a problem.

I am concerned we are not getting specifics from the States who really will be responsible for planning those impacts to put into the 1982 bill. I understand the reluctance because the notion of how much or whether the system will be deployed in Nevada and Utah is not a settled thing and will not be settled until the end of the year.

On the other hand we then have that kind of lag and I think we will all have to cooperate to do some very fast planning so wherever the system is to be deployed we can begin to get something into 1982 to initiate the construction that may be necessary because 1982 is the first construction year.

Senator GARN. I am rather concerned that the Trident legislation is a model. I would hope that you would consider the need for some improvement, because from my study of that situation most of the money was directed at capital needs initially; the operational end of it is usually what local government gets stuck with.

I think there needs to be a better balance between initial construction and operational needs. Frequently there are periods of 8 or 9 months in order for the local government to satisfy requirements for getting money.

I hope you would agree we need to simplify some of those procedures and speed it up; so, maybe we could use that as a model to start with, but learn from the mistakes that were made there and do a much better job.

Ms. CHAYES. Earmarking will certainly help the capital side of that. I think we are going to have to be much more innovative than any program that has ever been tried before if we are going to deal with the initial operational outlays.

I think we are going to have to have some basis to predict what the State and local revenue base will look like over time and then to work out some kinds of financial devices—which may not only be grant but maybe guaranteed loans or something of the like—that would permit the operational expenditures which will later be recouped by greater revenues. That would be easier to work out. It is something we are just beginning to look at ourselves.

The capital outlays have to be grant or most of them do.

### USE OF LOCAL CONTRACTORS

Senator GARN. There was another question. You spoke of Bechtel and the big construction companies, and how they would handle workers coming in.

I have a question. Is there any consideration of utilizing local contractors? I do not want to be misunderstood to say that I think the local contractors have the ability to come in and be the general contractor on the whole thing. It is a much bigger project than that.

There are a lot of fine small construction companies in our States. How much work are we going to keep in Utah? I do not require a specific answer, but just a general one. Do you look forward to utilizing as much as possible local contractors as subcontractors or participants in the project?

General BURKE. Yes, sir. The basic goal would be to use local labor and local contractors and businessmen to the extent we can because not only is it the right thing to do but it makes our job a lot easier. The people we hire locally would be people we do not have to bring in and add to the support problem.

Senator GARN. How do you achieve that as a practical matter? Is that part of the hiring policy within the contract documents? Do you specify that?

General BURKE. There is a lot of it built in already in small business set-asides where a local small businessman would have a very substantial edge over an outsider. We will provide incentives in the contracts to the extent we can.

Ms. CHAYES. The caveat there is the extent you want to encourage that, you are encouraging a higher degree of employment. To the extent that you have local businesses as subcontractors, they will hire more people.

I think the State planning process has to weigh the pros and cons of whether you want to have a cement plant in the State that would feed into it or whether you want to discourage that.

The area I come from it has gone to great efforts to encourage business coming in because it has been a depressed area. States know how to do that through their economic development offices.

You have to be very careful because the down side of that is the boom town effect will be even greater and the indirect employment can be either encouraged or discouraged.

### FAST TRACK LEGISLATION

Senator GARN. Secretary Chayes, is it true that the proposal that we talked a great deal about at the end of last year for fast track legislation has that been shelved for the present time?

Ms. CHAYES. Yes. It was really my responsibility. It was I that dreamed up the idea and it was I that said I thought we ought to try to proceed without it. There were several reasons.

It was my view that it probably could not succeed and it would create even greater suspicion and concern about what the system meant. The question that I had to answer was whether it was possible to meet the 1986 IOC without it. I had real concerns whether we were going to be able to accomplish that date unless we had legislation.

I am pretty well satisfied in the area of environmental regulation now. In part that is a result of the operational analysis. At the time we drafted the legislation we were looking at the seven geotechnically suitable deployment areas that had come from the analysis of the Milestones II EIS on which the basing mode selection was predicated.

It was not going to be possible to analyze seven areas. We felt we might analyze one deployment area very well and possibly another one and maybe even partially a third one.

The operational analysis that we began in November is completed analytically but it is not in final form. It made it clear that operationally only one other geotechnically usable area was satisfactory for deployment of the system.

That simplified the problem to the point where I now feel and our contractors have assured us based on the work they have done, that they can analyze the southern high plains as well, and therefore, I think we will certainly meet the NEPA requirements for alternative analysis.

The area where I am still uncertain is the area which I mentioned before which is the time for land withdrawal. Section 2 of our proposed bill that we never introduced simplified the land withdrawal procedures so we would not have to have legislation passed on every parcel to be withdrawn or every area to be withdrawn.

That is certainly possible from an administrative point of view. We have been working very closely with BLM and with Secretary Andrus who will give the priority the system requires because of its national security implications.

We must depend upon the congressional committees to hear and to approve that legislation within one session. There is no precedent for doing that at least in the defense area. In part that is because it never has had any priority. Other parts we have withdrawn have just sort of dragged on and on. An average would be more like 2 years.

On the other hand none of those have either had priority but neither have they been controversial. I think MX will be controversial. We have already had hearings before Mr. Seiberling. There seems to be a certain concern about the system.

I do not know how to look at that except we are just going to have to take our chances.

Senator Garn. Under what circumstances do you think you would have to go back to fast-track legislation?

Ms. Chayes. I suppose if we really got bogged down on land withdrawal we would attempt to secure some legislative relief in that area. It is not the antipollution requirements that really concern us.

For an issue such as water, we would never look to fast-track regulation to help us. It was always our intent, if legally permissible by the Department of Justice and if considered constitutional, that our policy would be to follow State law.

We do not foresee any problems in the antipollution area that cannot be corrected by construction—dust and air quality and so on. We feel existing law can be met.

### CONSIDERATION OF TEXAS AND NEW MEXICO FOR MX BASING

Senator Garn. I have one question that is a little bit out of the line of current questioning. You continue to mention the high plains area of Texas and New Mexico.

Has there been any consideration given to the area further south in Texas which is public land?

Ms. Chayes. I am not sure whether that area was part of the area that was previously identified in the seven sites. We have through our operational analysis pretty much established what I call a 200-mile rule. Essentially we find that operationally the system ought not to be within 200 miles of the Mexican border, of the coast or of any high value other strategic target.

We have eliminated the southern or far western sites on that basis. The reasons are complex. They range from jammers, and General Burke may want to elaborate. to sensors and the requirement that the ALCC's be able to circulate in their pattern free of nuclear blasts from other targets.

General Burke. I think that covers the key points.

Senator Garn. During field hearings last November, it was stated that following the announcement of an MX site selection, a preliminary economic adjustment plan normally would take 120 to 180 days to develop. I assume this means roughly 6 months after a base site selection; some time in 1982.

You would have preliminary economic adjustment plans in hand and this gets back to my point as to when would we have a final plan available in that area and according to the present MX construction schedule, does not that waiting period of 180 days put the cart before the horse once again?

You are not going to have your adjustment plan ready in time to meet the economic impacts that are coming? I am trying to get the time schedule lined up with the preliminary economic adjustment plan and then determine when the final one will come, or are we going to be delayed? Will the impacts be coming prior to the plan with that kind of a time schedule?

It was stated in a hearing last November that it would take 120 to 180 days to come up with a preliminary plan after a site selection.

Ms. Chayes. I do not know who stated the 180 days. We will have analyzed the impacts so that we have the data on which a plan can be based at the time we issue the draft EIS to our satisfaction. If it is the Office of Economic Adjustment that testified it would take 6 months, they have already been working on economic impact planning

As I said before they have not secured a great deal of cooperation from the State governments in that economic adjustment planning. They have been unwilling to send representatives to meet with the regional offices and to work out kinds of allocations of funds in various areas that these Federal regional councils can provide and work them into the 1982 budget.

In a way it theoretically can be done, but it absolutely requires the cooperation now of the States involved. We cannot do the planning for them.

Senator GARN. Certainly it requires State cooperation, but we are getting different types of testimony. I cannot tell you who said that in the November hearings, because I do not know at this point. We could find out. We just found out. Ask and it shall be given.

It was OEA Director Sheehan. That figure of 120 to 180 days was given in answer to questions. My point is that one of the real problems in Utah and Nevada is conflicting information. Maybe the States need to cooperate, but the Federal Government needs to get their act together also. You are dealing with a lot of entities from DOD and the Air Force. You are dealing with OEA. You are talking about dealing with Federal regional councils and so on.

There has been a great deal of information that is different and comes from different sources. There may be cases where you can clarify it and say that is not exactly what was meant and that we will not have overlap and duplication and there will not be delays. That is fine.

I am trying to be helpful in what I am saying that somehow the Feds have to get their act together as well.

If I put together all the different answers that I have had over the last 6 or 8 months from different agencies on what would happen, it is very confusing. If it is confusing to me and those of us who are studying it, then you can imagine why the attitudes of some of the public in Utah and Nevada, when they say they do not trust the Air Force or the Federal Government it is because they have received different answers.

Ms. CHAYES. I do not think there really is any conflict in this area at all. We have been extremely careful to leave the economic adjustment planning to OEA. We look at them and we question them within DOD. They bear the responsibility for economic adjustment planning. The Air Force bears the responsibility for economic impact analysis as part of the EIS. That is thoroughly accepted and understood both within DOD and the States.

The work with the Federal regional councils is OEA sponsored. In other words OEA is the focal point for all the agencies in the Federal Government to deal with the economic impact planning for any military project. They have been doing this for years.

They do it sometimes extremely well and sometimes it is a little slow, as you point out. It does involve the cooperation of the States now in order to be timely.

We can certainly look toward some temporary fixes or temporary measures if the States are reluctant to commit themselves to planning now. We are certainly doing by way of contractors some initial attempts at planning or estimating what is going to be needed but without the States' cooperation we cannot do any more than that.

### AIR FORCE FIELD OFFICE IN NEVADA

Senator **Laxalt.** Secretary Chayes, where are we in connection with locating a field office in Nevada for the Air Force?

Ms. **Chayes.** I think we are very close to selecting Air Force representatives in both Nevada and Utah. I think we even have them identified.

Senator **Laxalt.** Do you know where they would be located?

General **Burke.** They would be located in Nevada at Carson City and they will be there in June.

Senator **Laxalt.** Do you contemplate one for Utah?

General **Burke.** Yes, sir. It will be at Hill.

Senator **Laxalt.** You mentioned the operating bases and the final complement of personnel numbering around 10,000. Is that what it will round out to to operate this?

General **Burke.** It will be 12,000 to 13,000 direct employees with families and with an increase in the number of support jobs of people around those areas.

Senator **Laxalt.** Where will they be located?

General **Burke.** They would be divided between those two main operating bases.

Senator **Laxalt.** Where do you see the main operating bases being located?

General **Burke.** One in each State but the specific sites have not been selected.

Ms. **Chayes.** We have alternatives that we are putting forth. We have some question about some of them. We will analyze alternatives. It is here that the States have requested they discuss the location with SAC. They are in the process of doing that.

Some of the areas that have been identified are Ely, Kane Springs, Milford, Dalta, Fallon, and Peoche.

Senator **Laxalt.** You are talking about a lot of impact there. You are talking about 12,000 to 13,000 people plus their dependents. It is probably more people than there is in all the towns mentioned put together.

When are we going to be looking at this kind of impact? Will it be 1989 or 1990?

Ms. **Chayes.** The impact of each of the alternate areas for a main operating base will be set forth in the draft EIS; what the impact will look like. One of the reasons for selection of one alternative as opposed to another will be that impact.

We have had some questions with respect to Kane Springs on water resources. While that looked very promising in the beginning, further exploration makes Kane Springs look somewhat less desirable.

Senator **Laxalt.** Will these employees be phased into our State?

General **Burke.** Yes, sir. They would come toward the latter part of the deployment for the most part. The bulk of that effect would be felt from 1986 to 1989.

Senator **Laxalt.** We have a few years to plan for and phase into that part of it.

General **Burke.** Yes, sir.

### MILITARY/CIVILIAN PERSONNEL BREAKDOWN

Senator LAXALT. What percentage of these people will be military as opposed to civilian? Do you know yet?

General BURKE. We do not have that number. As I mentioned earlier, we are endeavoring because of this impact to make the fraction of civilians as high as possible. I think it will be much higher than we have done in the past at other bases just for that reason. Life would be simpler and better for all of us if we could have the bulk of the security force local folks rather than bringing in people.

We are looking to change jobs that have been traditionally military to civilian.

### COST ESTIMATES

Senator LAXALT. Have you developed any cost figures or is it too early?

General BURKE. The annual operating cost?

Senator LAXALT. Yes.

General BURKE. About $450 million per year.

Senator LAXALT. When will we have some information? Will that be in the impact studies in connection with the operating bases?

Ms. CHAYES. Yes. The O. & M. costs will be part of that; the expected payroll; the indirect payroll figures. We have some preliminary figures now.

Senator LAXALT. What will these people do?

General BURKE. They would be divided. In the operations function, the people who actually monitor and control the missiles and have that direct responsibility.

Senator LAXALT. You are talking about fairly high trained technical people?

General BURKE. Yes, sir.

Senator LAXALT. How many of those would there be roughly?

General BURKE. A few thousand including the missile maintenance people. I think most of those people would be uniform. The people in operational control and most of the maintenance people are military because they would be specially trained in Air Force schools for the most part.

The rest of the people are support people. They operate the dining halls and the barracks. A very large number of the people are security because it is spread over a wide area. It does involve nuclear weapons and the requirements are to have a high degree of security.

Senator LAXALT. Will we be actually establishing out in these two States new bases of a Nellis type?

General BURKE. Not nearly as large as Nellis. That type of design overall or concept.

Ms. CHAYES. A rather typical Air Force base. It would tend to be more inclusive. It would have more housing inside the fence then outside unless we were encouraged by the States to do otherwise for the housing industry outside.

Senator LAXALT. In terms of the impact it would not be forced on any one of these communities any more than they would want to assume?

Ms. CHAYES. No.

Senator LAXALT. To the extent you want to take that off them you would contain it within the base itself?

General BURKE. Yes, sir.

Where it would differ from Nellis is it would not have that huge flying operation and all those airplanes and runways and ramps that you see at Nellis.

Senator LAXALT. If I may summarize where I think we have gone today and correct me as we go along so I know my understanding is correct, we have moved from racetrack to the linear road.

General BURKE. Yes, sir.

### WATER USE

Senator LAXALT. We have had an absolute assurance from all concerned that in terms of the appropriation and placing of beneficial use of the water that it would be within State jurisdiction.

General BURKE. Yes, sir.

Senator LAXALT. Your estimation is that this will be a newly developed water from wells, principally ground water with very little acquisition from private ranches or otherwise?

Ms. CHAYES. That is our understanding of the possible and desirable.

Senator LAXALT. I would assume that once the initial construction project is completed, if there is excess water it would be generally available for other purposes and other uses.

General BURKE. Yes, sir.

### LAND USE BY CIVILIAN POPULATION

Senator LAXALT. In terms of multiple use we have an assurance from all concerned that we will fence off the 2½-acre parcels when they are determined. They will be secured but with respect to the public generally and specifically the miners and the livestock people and the recreationalists, they can feel assured they will have use of it at least to the extent they have now under the regulations of BLM for the use of that remaining land?

Ms. CHAYES. Correct.

Senator LAXALT. They have no real fear of eventual lock out because of security considerations? We are not looking at having 25,000 to 30,000 square miles of our respective States eventually being fenced out?

General BURKE. They have a real fear but it is unwarranted. It is not going to happen. We are not going to do that.

### IMPACT OF CONSTRUCTION WORKERS

Senator LAXALT. Will you be attempting to bring in construction workers without their families as much as possible as a matter of Air Force policy?

General BURKE. Yes, sir.

Senator LAXALT. Separate living facilities will be established for these people?

General BURKE. We have not got to that detail. That was Bechtel's assessment of the way it ought to be done and it sounded sensible to me.

Ms. **Chayes.** We will take every measure to mitigate the impact of the construction workers in the States not only the manner in which they live and move and size of the force, pacing of the use of automated techniques to cut down the numbers; every technique that seems sensible and available that will help we plan to try to use.

Senator **Laxalt.** In all these areas our respective offices here and certainly the offices in our respective States back there can look to be consulted all along the way as you have done?

General **Burke.** Yes, sir.

Senator **Laxalt.** We have no real fears of being rolled out there when push comes to shove?

General **Burke.** No.

### FURTHER STUDIES ON SPLIT DEVELOPMENT

Senator **Laxalt.** More important, this is a concern to Senator Garn as well as all of us in the delegation that predicated on the assumption that we want to assume our fair share of this load out there, we are defense minded and we recognize the value of MX but we do not want to be unduly burdened and we hope that you folks and this administration will make every effort to seriously explore split deployment. I think that is the crux of this hearing.

We would like to be assured that kind of effort will be made. I would also like to be sure that along the way when that exploration is being made we will be consulted as much as possible.

Ms. **Chayes.** I think the real accomplishment is the concern expressed by you and other members of Congress and by the people of the States that we look into split basing has certainly helped us to overcome a certain concern about making more complicated an environmental impact statement that was already complicated.

I think the logic of what is required, the logic of the operational analysis and just an honest and fair way of doing it has brought us to the conclusion that we must look at these alternatives that are operationally feasible.

The environmental impact statement will lay those facts out in the best way we can prepare them. I think we will then be able to see the extent to which any kind of split deployment makes sense; is cost effective; the tradeoffs are better or worse then deploying it only in two States.

I think the facts will be there for your to look at and comment on. That is really the best we can do.

### IMPACT ASSISTANCE

Senator **Laxalt.** In terms of impact assistance, to the extent that we hurt these small towns and areas and to the extent it hurts at all, that we can look to you people in the Air Force to attempt to obtain through the process whatever is needed to make those people as whole as possible financially. I assume we can look to that kind of cooperation from you.

General **Burke.** Yes, sir. It would be for selfish reasons if for no other. We have an interest in minimizing the adverse impacts because when it is all over the people who stay behind are Air Force people and we do not want to put them in an environment that is unwholesome or an environment where they are not accepted.

The MX is going to be without value unless we can recruit and retain top quality people to go out and look after it.

### STATE RELATIONSHIP WITH AIR FORCE

Senator **Laxalt**. The Air Force in Nevada and I assume the same is true in Utah, you have been good neighbors. As far as I am concerned in dealing with the Air Force, I am a little bit more comfortable.

I think if we can talk together and work out these arrangements then we can work out something consistent with the national security needs we have without in the process raping our respective States. I do not think either of you would want to do that.

General **Burke**. Certainly not.

Senator **Garn**. My relationship with the Air Force has been better than with the Department of Defense over the last 2 or 3 years. I may have a bias there, as a retired Air Force colonel. We are all subject to our own personal biases.

Secretary Chayes, I am well aware we are getting down to an area where we are talking about 25 square miles. Do you plan to scrutinize the public records to see what uses exist not in the whole area but when you finally get down to those areas that are being withdrawn such as oil and gas leases; mining and grazing, a very careful search?

Ms. **Chayes**. We are required to do that.

### COMPENSATION FOR EXPROPRIATED RIGHTS

Senator **Garn**. The second part of that question is will you compensate for expropriated rights, because I am well aware in dealing with BLM over the years that in many of these rights they say there is no value—but believe me there is. They are traded and they are bought and paid for. There is a great concern that not only that you study it, but they not be declared valueless.

Some of those people have paid a great deal of money for those rights that BLM will tell you have no value whatsoever. They do trade them. BLM does record them.

Ms. **Chayes**. I think there is a way of establishing the fair market value of those rights. I do not know the details because there are all kinds of claims. There are claims where there has been investment. There are claims where there are no investments. They are really in different categories.

We will follow the procedures to assure the fair market value is obtained and the one bit of evidence would be how much somebody paid for such a right from its fair market value.

### VERTICAL/HORIZONTAL BASING MODES

Senator **Garn**. General Burke, I have a few questions on vertical versus horizontal. It is my interpretation from everything that has been said that the only real objection to vertical is movement time.

Is it your assessment vertical would save a considerable amount of money?

General **Burke**. Vertical is somewhat less expensive than horizontal It is less than 10 percent of the total cost.

Senator Garn. I have been given estimates before by the Air Force that vertical would be as much as $10 billion less.

General Burke. No, sir. On an apples to apples comparison with the same features in the system one can design vertical systems that are substantially less but if you would not vary anything except the vertical and horizontal it would be more like $3 billion.

Senator Garn. Vertical can be much harder than a horizontal shelter, and therefore with a vertical system you would be able to concentrate them more closely and you would not need the horizontal separation. Is that correct?

General Burke. Somewhat; not a great deal. If the only phenomenon with which you were concerned was shock and blast that would be as you stated. At about the 5,000-foot point the EMP concern begins to dominate. While it cannot be stated precisely you could go slightly lower with a vertical. You could not go as much lower as you could if you were considering only the shock and blast.

Senator Garn. I think the hearings have been very helpful today. Senator Laxalt has summarized it very well. I was pleased to get a one-word answer from Secretary Perry on racetrack. I was pleased to get answers from Secretary Brown and both of you that we will get an honest and sincere appraisal of split basing.

I would summarize one more thing. Together with the change from racetrack to linear roads, the changes that we heard about first in a letter from Secretary Brown and then from Secretary Perry, and in their testimony today, about such changes as doing away with the railroad and going to the horizontal loading dock and changing the TEL, would allow us to anticipate some $2 billion in savings; also, we would potentially drop the number of valleys used from 50 to 35 with possibly more potential impact within those valleys.

There would be a 20-percent reduction in land usage and possibly a 15- to 20-percent possible reduction in personnel as a result of those changes. Is that a correct summary of the changes?

Ms. Chayes. The only point at which I would differ, is I do not think you will find a $2 billion net saving. I think there are some tradeoffs. I think I would rather reserve the exact amount of the net savings.

There have been other design features that have changed that we have not discussed here. An example is the steel liners for the shelter which add in some funds.

I think in the next few weeks we should have more precise figures on that. We had not included the cost of the mass simulators which now at this stage of design seems prudent to include in the program.

Senator Garn. Thank you very much.

Senator Laxalt. Secretary Chayes and General Burke and your various assistants, we thank you very much. I think it has been a very productive session.

### SUBMITTED QUESTIONS

Senators Huddleston, Garn, and I have a number of questions which we are submitting to the Department of Defense for response. They will be inserted at this point in the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

## QUESTIONS SUBMITTED BY SENATOR HUDDLESTON

### Relationship of SALT to M-X

Senator Huddleston: I think uncertainty over the future of SALT has also contributed to uncertainty over the MX. Again, whether accurate or not, there is at least some feeling that a final decision on a basing mode -- and the cost involved -- should be related to whether we are operating in a SALT or a non-SALT environment.

Is that a legitimate concern?

Answer: SALT II will help us with M-X -- and with a lot of other problems -- by placing a cap on particular kinds of threats. However, I am convinced that the basing mode we have selected for M-X is the best approach with or without SALT. We should not delay a decision any further.

### Need for M-X Decision

Senator Huddleston: In your statement, you note that Minuteman will become vulnerable in the early 1980's. This is, of course, 1980.

How long can we delay a final decision on the basing mode in view of the increasing vulnerability of our land-based ICBMs?

Answer: It is already impossible, of course, to deploy M-X before Minuteman becomes highly vulnerable. Fortunately, we have capable sea-based and airborne strategic forces to fill in the gap for a time. We must modernize our ICBM forces before there is another big problem with the strategic triad. We have an M-X system defined which is practical and affordable as well as having excellent military effectiveness. We should proceed with it without delay.

### Refinements to M-X Basing Mode

Senator Huddleston: You have referred to a number of refinements in the proposed basing mode.

Are these proven refinements or are they just on the drawing board?

Answer: The design refinements to the basing which we have discussed involve such matters as the detailed design of the transporters, the detailed design of the hardened shelters, and the layout of the roads. These are quite mundane engineering matters and will not increase the technical risk in any way. We have been working on them for several months in parallel with the previous baseline, so they are just as far along in engineering development as the old baseline.

### Breakdown of $33.8 Billion of M-X

Senator Huddleston: You have set the cost of the MX system at $33 billion in FY 80 dollars.

Could you break that down according to R&D, procurement, military construction, etc?

Are DoE warhead costs or operating costs included?

Answer: The total acquisition cost of $33.8 billion in constant FY 80 dollars for the former baseline concept of horizontal shelters in a loop road layout with integral TEL breaks down by appropriation as follows: RDT&E, $7.6B; aircraft procurement,

$.4B; missile procurement, $12.6B; military construction, $12.5B; and construction design, $.7B. Neither DoE warhead nor operating costs are included in these figures.

## M-X Cost

Senator Huddleson: You have given us a cost figure in FY 80 dollars but procurement and construction will extend well into the 1980s. What estimates of cost do you have in then-year dollars?

Answer: Based upon the current schedule for the M-X program, the total acquisition cost of $33.8 billion in constant FY 80 dollars would equate to $51.3 billion in escalated then-year dollars.

## M-X

Senator Huddleston: Any type of MPS (multiple protective structures) system depends at the most basic level on prohibiting the other side from determining which structures actually contain missiles.

How can we be so confident that this system can't be compromised?

Answer: The location uncertainty of the deployed M-X missiles will be preserved through the use of simulation and deception. Our program is designed to ensure that any observables created by the existence or movement of the missiles will be masked from whatever sensors an enemy might employ. In this manner, we can be confident that the deployed M-X force will be secure and that individual missiles will not be compromised. While mechanisms for locating missiles can be hypothesized, the scale of a meaningful Soviet operation has to be appreciated. I cannot argue that they could not possibly emplace covert sensors in one or a few shelters, for example, but they would have to "bug" hundreds of shelters to make a significant difference. I find it incredible that they could carry out such an operation without our knowing it.

## Soviet Mirroring of MX

Senator Huddleston: To what extent did concern over the possibility that the Soviets in a SALT environment might want to mirror our system drive the selection of a basing mode?

Answer: Our principal design concern in the SALT context was to achieve a design verifiable by national technical means (which satisfied other SALT constraints as well). By pursuing that objective, we will set a satisfactory precedent for verification of any mobile ICBM system, including one like our own, that the Soviets might deploy.

## MX and Soviet Fractionation

Senator Huddleston: Doesn't an MPS system encourage the Soviets to fractionate and produce more weapons, with the possibility of making the threat to the US and arms control even more difficult?

Answer: It is true that our MX MPS design could encourage the Soviets to fractionate to achieve a much greater number of ICBM RVs. However, that course of action is not open to them under SALT II. Further, the MPS design can be expanded to deal with such a Soviet eventuality in the absence of SALT II's limits. Thus, we are satisfied with MX's ability to meet the threat, with or without SALT II; but I certainly agree that such an outcome as you suggest would make arms control more difficult. However, the deployment of MX need not cause the Soviets to deploy more ICBM RVs. Rather than engage in an RV-shelter race, the Soviets should be motivated to seek a more survivable basing mode for their own ICBMs. This could lead to a more stable situation in which each country had survivable ICBM forces. Additionally, the MX system is compatible with SALT negotiation of further reductions in ICBM forces.

## Composition of Strategic Forces

Senator Huddleson: If we move ahead with the MX, what portion of our strategic force will be land based, what sea based and what attached to a bomber force and how would that compare if we failed to pursue the MX?

Answer: Each leg of the triad is strongest in some particular characteristic: The submarine force carries the most warheads; the bomber force can deliver the greatest megatonnage, while the ICBM force is most accurate and has the highest alert rate. But the overall capabilities of the strategic force are split in roughly equal proportions among bombers, submarines, and ICBMs. That situation would continue if we develop MX along with current programs to modernize our bomber and submarine forces. Not deploying MX would be equivalent to relying on a dyad of bombers and submarines because of the growing vulnerability of our Minuteman missiles. In that case, the capabilities of the force would be divided about equally between bombers and submarines, though again one or the other would be stronger in any specific characteristic.

## Potential for Backfill

Senator Huddleston: If the Soviets produce more and more warheads, the reaction will apparently be to backfill.

(A) How much backfill potential is being built into the system?

(B) What would the response be if the Soviet "kill probability" increases substantially?

Answer: In response to your first question, we have not made a final decision since it involves some complex tradeoffs with construction costs and timelines, engineering tests of the hardness of the shelters, etc., and a decision has not been necessary up to this point in time. Our best thinking at this time, however, is that we will probably allow for about one backfill shelter for each 7 shelters in the initial deployment.

If the size of the Soviet threat increases very substantially, the next steps after backfill would be to increase the numbers of missiles and/or to increase the number of shelters by using somewhat more land. At some level of increased threat, perhaps when we had doubled the number of shelters above the original 4600, it would be highly cost-effective to add a ballistic missile defense rather than increasing the number of shelters.

## SUM

Senator Huddleston: The Shallow Underwater Missile (SUM) is a widely discussed alternative to the MX. Why do you oppose this alternative?

Answer: Studies of SUM by OSD and the Navy have indicated that the SUM system is feasible; however, it would be significantly more expensive than SUM advocates have stated, it would not be available until the 1990's, and it offers no apparent advantages over more conventional submarine based missile systems. The total cost of a SUM system is difficult to assess since such costs critically depend on survivability and at-sea availability assumptions which cannot be defined, with any degree of accuracy, for a system which is strictly a paper concept. It does appear that such a system would be roughly equivalent in cost to an MX system which would deliver the same number of reentry vehicles on target. Such a conclusion, however, must be viewed with caution since SUM costs are based on optimistic assumptions of technological advances and cost-reduction extrapolations which might be achievable by the 1990's. SUM costs may therefore be low and the system could cost significantly more than a comparable land-based MX force.

A realistic IOC for SUM would be in the early to mid 1990's. Such a scheduled, by itself, would infer that SUM is not an alternative to MX. In addition, deployment of SUM rather than a survivable land-based ICBM system would transform our strategic forces into a Dyad, with a new type of submarine, less capable than TRIDENT, to complement the existing fleet. This action would dilute the flexibility and survivability hedges inherent in a TRIAD and eliminate the unique military capabilities provided by our land-based ICBM's. Based on the above, we have rejected SUM as an alternative to the MX system.

## MX and US Doctrine

Senator Huddleston: Deployment of the MX would give the US the capability to destroy Soviet ICBMs. Doesn't this, in fact regardless of what may be said, represent a profound change in US strategic doctrine?

Answer: Deployment of MX does not in any way represent a change in our doctrine or strategy, which was and remains the deterrence of nuclear war. Our forces and our strategy have always included an ability to attack military targets. Furthermore, MX will not give us a disarming first-strike capability against the Soviet Union, since the Soviets would still have sizeable and powerful strategic forces remaining after an MX strike.

## Orbital Bombardment Systems

Senator Huddleston: There has been more discussion of placing Minuteman IIs into a parked orbit or loiter position.

Could this be an alternative to the MX?

Answer: No, I do not think this is a practical alternative to M-X at all. In the first place, it has now been agreed by the original proponents of this idea that a new missile would be needed. This would not be a low cost modification at all, but a very expensive new missile development. It is technically possible, but it would be a major new development program. Beyond the cost and technical considerations, however, I believe that it would be an undesirable and indeed dangerous system to have. The Soviets could hardly distinguish between our launching a part of this force just to put it in a protective posture and an all-out attack on them. They might launch ICBM's at us when we were just trying to make our system more survivable. Even if they did not, if we launched on a false alarm, we would have expended some very valuable hardware with some possibility of recovering the warheads after dropping them into the sea. I do not plan to explore this suggestion any further.

## QUESTIONS SUBMITTED BY SENATOR LAXALT

### Delays in MX IOC

Senator Laxalt: The IOC (initial operating capability) for the MX was initially planned for 1982. It has now slipped to 1986, with full deployment now set for mid-1990. In view of the nature of the MPS configuration, in the sense that it is designed to absorb large numbers of Soviet reentry vehicles, to what extent can the MX be considered an answer to the problem of Minuteman vulnerability in the 1980s?

Answer: The initial operational capability for MX has slipped beyond earlier estimates. A major reason for the delay was the desire of the Department to find and develop a basing mode for MX that would respond to the vulnerability of Minuteman and insure the effectiveness of our ICBM force into the 21st century. We examined and discarded a number of concepts before coming up with the present concept of basing MX in multiple protective structures. This process took time, but DoD believes the result justifies our efforts.

It is correct to note that MX will not answer the problem of ICBM vulnerability until the late 1980s. However, because of our strong bomber and submarine forces, the momentary vulnerability of Minuteman does not increase the risk of war or confer upon the Soviets any great political leverage. Failing to take action, on the other hand, would increase Soviet incentives to develop countermeasures to our bombers and submarines. MX is an answer to this problem. By deploying MX, we show the Soviets our determination to maintain the Triad and frustrate any future attempt to upset the strategic balance.

### M-X Schedule

Senator Laxalt: The social and environmental consequences of a system of this magnitude are staggering. The potential for lengthy and time-consuming legal action is endless. In Nevada alone we have been notified by the State, Indians, environmentalists, ranchers, and rockhounds, all of whom are threatening to go to court to sure for purposes of delaying Racetrack. How much faith can be put in even the mid-1990 IOC?

Answer: The social and environmental concerns of all known groups are being considered in our planning for construction and deployment of the M-X system. I am confident that these concerns will be addressed to the satisfaction of all interested parties in a time from which will permit the achievement of full deployment by the end of 1989.

## M-X Schedule

Senator Laxalt: Although of a lesser magnitude, the fate of the Alaska Pipeline can be instructive as to what is likely to happen to Racetrack. Tied in knots in the courts by environmental suits for seven years, it was left for dead until finally rescued by special legislation passed in both Houses after intense controversy by very narrow votes. I understand the so-called "Fast Track" legislation has now been shelved. Is it realistic to assume that in the absence of such legislation, Air Force timetables can be met? If this is not realistic, then are we not in fact talking about a full operational capability sometime in the early-to-mid-1990s, which would thoroughly vitiate any relevance the system may have for meeting the threat to our silo-based ICBMs in the early 1980s?

Answer: The Air Force prepared draft legislation which would have permitted use of streamlined procedures without avoiding any of the substance or intent of the various environmental safeguards. This draft legislation was prepared as a precautionary measure that might be pursued, if required, to protect the program schedule by reducing procedural delays. After careful review and close coordination with the Department of the Interior, we have determined that the legislation is not required at this time. We believe that any legal challenges that might arise can be processed in a timely manner within the framework of existing law, and that current schedules for M-X construction and deployment can be met.

## Costs of M-X and Minuteman

Senator Laxalt: Secretary Brown has estimated that, in FY 1980 dollars, the total acquisition cost of the Minuteman was $40 billion, as against an estimated $33.8 billion for Racetrack. In view of the massive infrastructure involved with the Racetrack system, could you please explain why Minuteman would be cheaper?

Answer: Several factors enter here. There is a great economy of scale in building larger missiles, and M-X is almost three times the size of Minuteman III. While M-X has a lot more shelters (4600 vs. 1000), the Minuteman silos are much more elaborate and a Minuteman silo would probably cost 4 or 5 times as much as an M-X shelter today. Minuteman has 50 expensive underground launch control facilities, while M-X will have none. While M-X will have 200 transporters, Minuteman also has some transporters which were very expensive because they had to be as light as possible, built like aircraft, so they could drive on public roads. Even at that, we spent a fair amount of money upgrading roads and bridges. We spent a tremendous amount upgrading the hardness of Minuteman to electromagnetic effects from nuclear weapons, while all this technology is being designed into M-X from the beginning. Minuteman involved substantial buying of private land, while we have planned to locate M-X on public lands. The $40 billion Minuteman cost does include the acquisition of some equipment which has been replaced as new technology made it cost-effective to do so. Obviously the same kind of thing could happen with M-X at some time, but any changes would be presented on the basis of the military effectiveness the country was buying for the money. My original point to which your question referred was that

M-X is not, in contrast to some statements in the press, by far the most expensive military system ever built, and I think your question is amply proven. The tenor of your question is very interesting, however, and I would like to make one further point. Minuteman is known to the people in its deployment areas as a good neighbor, and the rest of the American Public is hardly aware of it at all. It just sits there quietly, so to speak, providing an important part of our strategic capability at very modest annual operating cost. It is easy for us to forget now, therefore, that its design and construction was a truely monumental undertaking and it also has a massive infrastructure. Minuteman spent as much or more in its peak year than M-X will in equivalent dollars. I feel confident that M-X will be just as acceptable to the public, including those in the deployment areas, as Minuteman has been.

### Cost of M-X

Senator Laxalt: In a recent study, the GAO has indicated a large number of cost uncertainties. We still do not have clear DoD projections as to: (1) the specific size of the MX force; (2) the spacing of the shelters; (3) the size and type of the TEL vehicles and simulators; and (4) the number of base support facilities which may be ultimately required. In view of these sizeable uncertainties, how confident can the Defense Department be in its contention that the MX will not be significantly more costly in real terms than other major strategic systems?

Answer: We believe that we have better estimates of the cost of the elements of the M-X system than we usually have for systems at this stage of engineering development. Our missile costs are based on very recent experience such as the Navy's C-4 missiles which are now in production. This experience is readily scalable to missiles of different sizes using similar technology. As far as construction costs are concerned, we have had a group of nationally recognized experts in construction costing, reporting to the Defense Science Board, prepare independent estimates in addition to those prepared by the Air Force and the Corps of Engineers. Such matters as shelter spacing and the base support may influence the costs positively or negatively compared to the present cost baseline when final designs are complete, but they could not cause large enough changes to destroy our comparison with other systems. The only really major change could come about if it were necessary to make a major increase in the size of the system. As I have pointed out in a classified report recently submitted to the Congress, even a highly increased threat would result in a cost which is still within a few billion dollars of the cost of other systems.

### Reaction of Soviets to MX

Senator Laxalt: An additional complicating factor is the likely Soviet reaction. Current projections are for 200 missiles and 4600 shelters. But it is impossible for Congress or anyone else to know just how big the system could become in the event of a Soviet attempt to overwhelm it. The Congressional Budget Office has offered a worse case assumption with a maximum Soviet effort which would require 450 missiles, 23,000 shelters and 100 billion FY 1980 dollars. Could you please comment on the CBO analysis?

Answer: The plans for 200 MX missiles in 4600 shelters were developed for the threat that we expect in the late 1980s. The

Soviets could build beyond that threat, particularly if the U.S. is unable to agree with them on limiting nuclear armaments. In that case, we may have to add more missiles and shelters, which would add to the cost of MX. However, the worst case of 450 missiles and 23,000 shelters envisioned in the CBO report is not realistic. If the Soviets deployed many thousands more counterforce weapons, as envisioned in this worst case, we would encounter a situation that is not consistent with an an arms control environment. Deploying an ABM system for the defense of MX would respond to such a threat at much lower cost than a huge expansion in MX. Moreover, our capability to take these actions should convince the Soviets of the futility of trying to threaten MX, thereby reducing the likelihood we would ever have to contemplate such actions.

## Affordability of MX

Senator Laxalt: Beyond the program cost itself is the broader issue of affordability. The Soviet challenge in the 1980's is comprehensive. We have dire defense needs in many areas and relatively fixed resources. As the so-called bow-wave peaks in the mid-1990's, could other extremely important defense systems be crowded out?

Answer: This year's Presidential budget submission specified five year real growth for Defense of 4.6%. Assuming additional dollars are added to cover all the effects of inflation, as well as possible increased costs of maintaining an all volunteer force, these funds should provide adequate overall defense through the middle 80s. This of course assumes no radical increase in the level of Soviet defense spending or no unexpected technological breakthrough.

Senator Laxalt: I note in the FY 1981 defense budget that the procurement level for Trident boats has been stretched out from 3 every 2 years to 1 per year. I also note that there are no funds for the Trident II missile nor is there a new manned penetrator or a new cruise missile carrier. Also absent are any air defense interceptor warning for our bombers or a significant attempt to upgrade our $C^3I$. In theory, of course, we could have far greater funding for defense and I would favor that. But in practical political terms, is Racetrack likely to act as a kind of giant sponge which will soak up funding desperately needed for other programs?

Answer: MX is a very expensive program -- like Minuteman, Trident, and other major strategic systems. However, maintaining the strategic force capability needed to deter nuclear conflict is our highest defense priority, and we must be willing to pay the price. Our prioritized five year defense plan fully funds MX along with many other initiatives, including improvements to our $C^3I$ network, programs to preserve our options for the Trident II missile, a new cruise missile carrier, and basic research on a new manned bomber.

### MX Resistance to Threat Escalation

Senator Laxalt: Equally serious is the fact that Racetrack may not work at all. The logic behind Racetrack is to force the Soviets into an adverse exchange ratio, i.e., to create a situation where any attack on our ICBM forces would require more RVs than it could possibly destroy. The logic of the adverse exchange ratio is quite elegant. A race of warheads against shelters may be primitive and unproductive. But Soviet nuclear strategy has always been primitive in a theoretical sense and more sensitive to battlefield experience than theoretical elegance. How do we know that the Soviets will not simply accept the cost inherent in the adverse exchange ratio and attempt to build in such a way as to overwhelm the system anyway?

Answer: There really is no way for us to know what the Soviets will do in response to our deployment of MX. We know what we think a rationale enemy would do. Most importantly, he would not attack MX. Secondly, he might build a survivable mobile system of his own or he might negotiate real reductions in strategic arms. We would welcome these outcomes as rational, stabilizing responses. But if, instead, he initiated a significant buildup calculated to overwhelm MX, we would have sufficient notice of such intent to allow us to expand our system as necessary and to consider site defense.

## QUESTIONS SUBMITTED BY SENATOR GARN

### ICBM VULNERABILITY

Senator Garn: Mr. Secretary, you said in your FY 1981 Defense Department Annual Report that "we can live temporarily with the vulnerability of one triad leg, so long as the other two are in good working order."

Why can't we live with ICBM vulnerability for the indefinite future?

Answer: Our triad of strategic forces has served us well over the years, due to its diversity of survivability modes and capabilities. We have remained capable of carrying out our strategic objectives even during those periods when one of the triad elements has been significantly degraded. These periods have been of limited duration and we have always been able to solve our problems. If we were now to accept the degradation associated with the vulnerability of our land-based ICBM force, we would be foresaking the benefits we have in triad diversity. Reliance on the submarine and air-breathing elements of the triad would place us in a very dangerous position. The possibility of problems affecting either of these forces is real, even if we cannot foresee such problems. Should either of these forces face survivability or equipment oriented problems in the future, we would be left with a strategic force incapable of meeting our strategic objectives. We must, therefore, strengthen our ICBM force, through deployment of the M-X system, in order to retain the necessary diversity and maintain a strong deterrent force.

## Bomber Force

Senator Garn: Do you really believe that our current and projected bomber force for the 1980s is "in good working order"?
Answer: Yes, Senator Garn, I do.

## Strategic Forces

Senator Garn: How many Trident submarines will the U.S. have when the last Poseidon submarine is retired at the end of its 25 year lifetime? How old will the B-52 bombers be at that time?
Answer: First of all, I would like to make it clear that we are not planning to retire our Poseidon force at 25 years of age. In order to preclude a significant dip in SLBM launchers in the late 1980s and early 1990s we are evaluating the feasibility of retaining a portion of the Poseidon force for up to 30 years. Regarding your question, a 25 year retirement for Poseidon would result in the last submarine leaving service in 1992. At that point in time we would have 16 Trident submarines. The newest B-52 would be 30 years old when the newest Poseidon submarine reaches an age of 25 years.

## Penalties for Split Basing

Senator Garn: As you know, Mr. Secretary, I favor the MX missile but have serious questions about the basing mode and its impact. The initial 4600-shelter system will have a severe impact. One means of keeping the impact of the basing mode within bounds is to use split basing. Can you estimate the incremental cost of deploying a second base outside of Utah and Nevada? What are the operational arguments against this concept?
Answer: Our preliminary estimates have indicated an additional cost of $3 billion to $4 billion. The operational penalties include the need for more people and more launch control aircraft in continuous operation. The actual operation of the MPS may be much more complex itself in more populated areas, but we have not worked that out yet. As you are aware, we are performing a very thorough study on these costs and penalties, and you will be provided definitive information as soon as it is availble.

Senator Garn: Mr. Secretary, you put emphasis on the additional cost of split basing. Would you advocate placing the entire U.S. bomber or fighter bomber force in a single state simply because it was judged to save money?
Answer: The question is hypothetical, of course, since for survivability it is necessary to locate only a limited number of bombers at each base, and our array of bases has grown up over seven decades. Even if we were starting with a clean slate, we could not base all the bombers in one limited geographical area because they would be vulnerable to barrage attack. Another reason this example seems unreasonable to the intuition is that the bomber forces involve a great many more people than M-X will.

## SALT Impact on M-X

Senator Garn: Wasn't the design of the MX system, particularly the choice of the large missile and the horizontal bunkers, driven by SALT considerations -- the requirement to argue that the U.S. could deploy an equivalent missile to the SS-18, the limitation of launchers rather than missile payload under the agreement and the requirement that the shelter not look like a silo?

Answer: The considerations you mention were part of the evaluation of the M-X system design, as were many other considerations. In the final analysis, SALT considerations did not drive M-X system design. Rather, strategic requirements, survivability requirements, and cost considerations have led us to the present design for both missile and basing mode. On the specific point of size of the M-X missile, I would point out that with an MPS system, it is highly desirable from the cost standpoint to have the largest missile you can feasibly operate in an MPS mode, and the M-X is approximately that size.

## M-X Site Location

Senator Garn: Didn't these SALT related features dictate deployment only in a few areas of the country and maximize the environmental and social impact by placing an enormous number of shelters in Nevada and Utah?

Answer: M-X basing locations were not driven by SALT related features of the system. Instead, the preferred location in Nevada and Utah was driven by considerations such as land suitability, environmental,economic, and social impact, and operational factors such as the range to the desired targets.

## Comparison with Minuteman

Senator Garn: The United States split deployed the original Minuteman ICBM force in six bases, each of which had 15 to 20% of the force. By comparison with MX, Minuteman was a small scale construction program. Why wasn't the decision made to split deploy MX in order to minimize environmental and social impact?

Answer: Twenty years later, it is easy to lose sight of the fact that construction of Minuteman was a herculean program itself. As I have pointed out on several occasions, we have spent substantially more on Minuteman in 1980 dollars, than we expect to spend on M-X. While there are only 1000 Minuteman silos compared to 4600 M-X shelters, each silo is much more complex and expensive. Minuteman was not a small scale construction project by any standards. Minuteman was split among six bases because of the very wide spacing of the silos. The system was designed in a different era when the threat was a limited number of very inaccurate, high yield warheads, and our understanding of the design of hardened structures was in its infancy. The silos were spaced about 5 miles apart, compared to a spacing of 1 mile for M-X. Therefore, the total area of the silo fields is about 25,000 square miles, while a comparable figure for M-X is 4,600 square miles. Thus each of the six Minuteman wings actually covers about the same geographical area as all of M-X, and it was necessary to divide the system into several parts.

## Minuteman III Options

Senator Garn: Why did the Defense Department destroy the tooling for the first stage of the Minuteman III? Didn't you destroy the option for deploying additional Minuteman III in a MPS system by this action?

Answer: The critical tooling for Minuteman III is in storage. The more common tooling which could be used on other programs was transferred to those programs. The most severe problem is actually procurement of a lot of the parts from second- and third-tier vendors. We always find that after a lapse of even a few years, the same parts are no longer available and indeed some of the vendors no longer exist. To have maintained a capability for rapid re-start of Minuteman production would have cost a large amount of money which was much better used on other programs. There is actually no effective way to maintain such a capability without buying and storing a lot of the parts, and it almost amounts to keeping the production going.

## Change to Linear Road Layout

Senator Garn: Mr. Secretary, your letter to me of last week on refinements to the MX basing mode stated that we were doing away with the large transporter-erector-launcher that had an automated "dash" capability, and that you are now proposing that we build so-called horizontal loading dock shelters. This is a step in the right direction. Dr. Perry has recently written to me that the Administration is considering moving away from the racetrack road plan to either a "grid" or "section" road network plan for MX. If this is true, when will this be officially announced? Is the "racetrack" dead? How much money will this change save the taxpayers?

Answer: I am announcing this change today, and you may consider the loop road layout, or "racetrack", dead. The cost savings cannot be very precisely estimated until engineering design studies are complete, but rough estimates are in the neighborhood of $2 billion.

## M-X Survivability

Senator Garn: Vertical silos are clearly cheaper and more blast resistant then horizontal shelters. The primary argument being used by Administration spokesmen against silos is increased time to move the entire force. This implies that the Soviets can determine the location of the entire force simultaneously.

Is there any technique that the Soviets or the U.S. have or can develop over the next two decades that would allow them to determine the location of the M-X missiles among the shelters?

Answer: I know of no such techniques that cannot be defeated through simulation of missile observables. However, we do not think it prudent to allow ourselves no fallback position at all, should we lose, even temporarily, confidence in our ability to matain location uncertainty. The dash capability with horizontal shelters provides that fallback. I would also comment that, while we have stated that vertical shelters can be made harder more cheaply than horizontal shelters, the horizontal shelters will be hard enough to achieve the desired survivability.

### M-X Survivability

Senator Garn: Is there any basis to conclude that ability to move the entire force and stage 4600 loading and simulated loading operations in 48 hours with silos rather than 12 hours with horizontal shelters is an important advantage?

Answer: While we have mentioned this as an advantage, I do not consider it of first importance. Much more significant is that horizontal shelters will give us the capability to move missiles into a shelter of our choosing during flight times of Soviet missiles if we choose to do so. This provides a very valuable backup capability if we ever lose confidence in our ability to keep the location of the missiles hidden.

### M-X Survivability

Senator Garn: No one can argue that additional mobility is not an advantage. But if additional mobility is so important that we are willing to pay a major price for it, why did we opt for the big missile which has less mobility than the Minuteman III or an advanced technology small ICBM?

Answer: While mobility is extremely important, simple economics must also be considered. If we were to proceed with a smaller missile with inherently less payload, we would need more missiles to provide an equivalent force of surviving reentry vehicles. Such a force would cost significantly more than our baseline M-X force, require substantially more people, and could easily reach a point where it was not affordable.

### M-X

Senator Garn: How many fewer shelters would be required if the United States had the options for the deployment of an ABM defense of the M-X missiles?

Answer: If the M-X system is faced with the baseline Soviet threat, it would not be cost-effective to develop and deploy an ABM defense. We would therefore continue to plan on a 200 missile, 4600 shelter system even if we were allowed to deploy an ABM defense. This would not necessarily be the case under more extreme threat conditions.

### VULNERABILITY TO LASER ABM

Senator Garn: Progress has recently been made in the development of high energy laser weapons that could be deployed on satellites for ABM defense. If this weapon is successfully developed it might have the same impact on military affairs as the development of the atomic bomb. How would the choice of a large MX missile affect our chances of being vulnerable to such a weapon if it were developed before 1990?

Answer: [Deleted.] With the types of lasers which we understand now, fielding of such a system could be much more expensive than the M-X program. Of course, one cannot exclude the possibility of a breakthrough in lasers which would make a spaceborne laser ABM look more attractive. However, there are a wide variety of countermeasures we could take ranging from hardening of the missiles to space borne ASATs which could reduce the effectiveness of a laser ABM system.

## SIMPLE ABM SYSTEMS

Senator Garn: Some defense analysts have suggested using a simple ABM system to defend ICBMs in which metal darts or pellets would be projected into the flight path of Soviet RVs in the immediate vicinity of ICBM shelters. The theory is that a simple radar, presumably linked to larger radars, would indicate the moment at which to fire the pellets. William A. Davis, Jr., the Deputy Ballistic Missile Defense Program Manager, recently stated:

"In general, simple BMD systems are difficult to synthesize which meet the criteria of low cost, rapid deployability and adequate effectiveness...most of the current candidates suffer from one or more deficiencies."

Are there any simple BMD system candidates which suffer from fewer deficiencies than others? What are the specific problems with the dart or pellet system?

Answer: During the past two years, over 20 simple, novel BMD concepts have been evaluated and all were found to have significant system limitations.

BMD system concepts which use masses of unguided pellets or darts as weapons to effect low-altitude destruction of reentry vehicles require very large numbers of projectiles to achieve a density sufficient to insure a hit on the RV at any aspect angle. In addition, the energy of the pellets or darts is marginal to insure a kill at nose-on aspect angles. The result of these limitations is that the cost and complexity of a deployment sufficiently large to produce a useful defense are very high for the marginal effectiveness that is obtained.

Specific technical problems with the dart or pellet systems include: (1) aiming of the assemblage of darts or pellets, (2) survivability of the darts, (3) aerodynamic stability of the darts after launch, (4) the physical size of the explosive required, (5) designing darts or pellets which form a compact mass as a warhead, but separate after launch and become aerodynamically stable, (6) lethality of the darts or pellets upon impact, and (7) vulnerability of the short range intercept system to offensive precursors.

Currently, a class of [deleted]. There may be other simple, novel BMD concepts proposed in the future and attractive concepts will continue to be evaluated.

## Road-Mobile ICBM

Senator Garn: What are your reasons for not choosing to deploy a road-mobile ICBM?

Answer: The principal reason is that a road-mobile ICBM is totally useless unless we have several hours of warning. We have done detailed analyses of road-mobile concepts. Their survivability is virtually nil unless you have at least 2 hours warning. If you have 6 hours warning, the survivability is very good, assuming the public highways would remain passable. For the same number of RVs deployed, the cost would be about 75% of the cost of M-X, and we could not justify such an expensive system which is completely dependent on hours of warning.

I would also like to emphasize a dangerously destabilizing feature of such a system. Suppose that in a period of high international tension we decided to put the road-mobile system in its survivable mode on the highways. The deployment would be highly visible to the public and therefore to Soviet agents who could immediately communicate our actions. The Soviets would know they had an hour or two to launch a massive strike or it would be too late. The implications are obvious.

## SUM

Senator Garn: Mr. Secretary, we have heard a lot about SUM, the shallow underwater missile concept, in which ICBMs would be deployed in horizontal canisters strapped to the hulls of small submarines. As you well know, I think that SUM is a poor idea, and would like to explore some questions about it with you.

Could you explain the Van Dorn or surf zone effect?

Answer: The Van Dorn effect is the creation of extremely high ocean waves over large areas of the continental shelf by an underwater detonation of a high yield nuclear weapon appropriately placed in deep water off the shelf. Large breaking waves would be generated resulting in high velocity lateral water motion on the shelf. Submarines located in such an environment would be unlikely to survive in good enough condition to launch ballistic missiles.

Senator Garn: How could SUM avoid that effect?

Answer: Submarines can avoid the Van Dorn effect by operating in deep waters off the continental shelf.

Senator Garn: Do the small German submarines that have been proposed as candidates for SUM have sufficient internal space for batteries, missile control equipment, ballast tanks, etc.?

Answer: The small German submarines proposed as candidates for SUM do not have sufficient internal volume for required equipments associated with the strategic mission.

Senator Garn: How could we compensate for that?

Answer: There is no easy way to compensate for this lack of internal volume. This is one of the many reasons why such submarines were considered infeasible for SUM and why, if such a system should be considered desirable, a larger, new design platform would be required.

Senator Garn: Would the cost effectiveness of SUM be increased by having more than two missiles per submarine? Would more missiles per submarine require a larger submarine?

Answer: The minimum sized submarines, derived in the OSD and Navy SUM studies, can carry up to four MX sized missiles per submarine. If it is desired to carry more than four missiles per submarine, a larger submarine would be required. Due to economy of scale, the more missile carried per submarine, the lower the total system cost would be for a fixed level of inventory missiles. Should platform proliferation be desired, two missiles could be carried on these minimum sized submarines; however, approximately twice as many submarines would then be required for a fixed missile inventory and system costs would therefore increase significantly.

Senator Garn: Are submarines operating close to the surface vulnerable to waves in heavy seas, especially if carrying missiles strapped onto the outside of the submarine?

Answer: Submarines with external missiles could be vulnerable to heavy seas when operating at or near the surface. This is especially true for a submarine, such as the existing designs proposed for SUM, that has not been designed to withstand the stresses associated with such an environment. This problem could probably be eliminated with a new design submarine specifically engineered to withstand these stresses.

Senator Garn: Wouldn't a diesel-electric submarine have to snorkel for perhaps a couple of hours a day? If there were a storm and the submarine had to snorkel, wouldn't it risk destruction or damage?

Answer: A diesel-electric submarine would have to snorkel at regular intervals in order to recharge batteries. This could occur daily depending on battery usage. As was mentioned before, a new design submarine could probably avoid storm damage during snorkeling periods; however, it is likely that the proposed SUM systems which utilize existing diesel-electric submarine designs would be vulnerable under such conditions.

Senator Garn: Could Soviet radars, whether on ships or on satellites, detect the snorkel mast of a submarine? Can we rely upon the Soviets not being able to detect the snorkel mast of SUMs in, say, 1995? If they can detect the snorkel mast, might the Soviets either be able to pinpoint the individual SUMs or locate, over time, the SUM patrol areas?

Answer: It is possible that, by 1995, Soviet radars would be able to detect the snorkel mast of a sumarine. This could increase the vulnerability of SUM to some degree; however, operational procedures could be utilized to reduce this vulnerability to low levels.

Senator Garn:. If we could put a strategic range missile into a canister and launch it from the sea, might the Soviets be able to do the same? Could such canisters be attached to all kinds of ships -- tankers, trawlers, navy ships, submarines, barges, and so on? Could we have much confidence in our ability to count the number of canisters and missiles the Soviets could build? Could we monitor the number of such canisters they could deploy? Do we have arms control problems of this type with internal tubes of current ballistic missile submarines? Would you agree, then, that by the time we get done modifying the SUM proposal to correct its weaknesses, we end up with a large nuclear-powered submarine with internal missile tubes -- that is, a Trident or Poseidon class submarine?

Answer: I see no reason why the Soviets wouldn't be able to encapsulate ballistic missiles. If this were done, such missiles could be deployed on any sea-going platform of appropriate size as long as the platform was outfitted with equipments necessary for the strategic mission such as fire control and navigation systems. Should the Soviets proceed with such a system, verification of the number of canisters and missiles manufactured and deployed would certainly be more difficult than verification of the number of internal launchers of current ballistic missile submarines.

While all of the above are problems, I am not concerned that any of them are insurmountable problems. Should we decide to deploy a

SUM system, I am sure we could make it verifiable. It should be noted, however, that when I talk about a SUM system I am referring to a new design submarine since modification of existing designs is not a feasible approach. With this in mind, I am sure we could deploy a small, non-nuclear powered submarine with externally carried missiles. Such a platform would not, of necessity, evolve into a large, nuclear powered SSBN such as Trident or Poseidon.

I do want to make it clear that, while SUM is feasible, it is not a reasonable alternative to other strategic systems. SUM cannot compete as an M-X basing mode since it would not be available until the early 1990s. Even if this were not a consideration, deployment of SUM in place of a land based M-X would result in a dyad of strategic forces and severely reduce the ability of our forces to hedge against unforeseen failures in the submarine and air-breathing elements of the triad. Finally, SUM would simply be another submarine based strategic system, more expensive and less survivable than Trident, and therefore of no apparent utility. Based on this rationale I can see no reason for proceeding with SUM.

We are continuing to explore many of the concepts which were proposed by SUM advocates to determine if they can be applied to our next generation of tactical and strategic submarines. Among these concepts are the means to achieve smaller crew sizes and smaller submarines through the application of fuel cell propulsion, miniaturized electronics, and automation, as well as novel ways of communicating and navigating at operating depth.

Senator Garn: Is it your judgment that SUM, as currently envisioned, is not a credible deterrent?

Answer: There does not appear to be any payoff for developing SUM as a basing mode for MX or as an alternative to our current sea-based strategic systems.

## IMPORTANCE OF IOC

Question: Given the size of the ICBM force that we expect the Soviets to have by July 1986, when the first ten M-Xs are to become operational, if the Soviets launched an attack on M-X at that time, how many M-X RVs would we expect to survive? What, then, is so important about meeting the IOC date? Isn't the full operational capability date more militarily significant?

Answer: If the Soviets launched a nuclear attack upon the M-X force on the day of the IOC, the adverse exchange ratio of Soviet Union reentry warheads expended to United States warheads destroyed would already be in force. That is, in order to "kill" all ten M-X ICBMs with ten warheads each, the Soviets would have to apply 230 of their warheads.

The importance of the IOC date is that the full operational capability (FOC) is achieved by orderly hardware production and facility construction, placing missiles on alert by graduated numbers as they are produced and as shelters are finished. The FOC is the most militarily advantageous, but we must begin deployment in this manner in order to proceed to the 1989 FOC date.

## M-X SURVIVABILITY

Senator Garn: The MX/"MPS" system is designed to enable a specified number of RVs to survive an attack by a specified number

Answer: The SAFEGUARD test program, which was conducted after the ABM debate and the limited operational experience obtained at Grand Forks showed that many of the technical and operational problems that were raised during the debate were solved and that BMD can work. Since SAFEGUARD, the BMD research and development program and advancing technology have provided solutions to key feasibility issues related to traffic handling capability, vulnerability to attack and nuclear effects, discrimination capability, and cost and have greatly extended the technical capability of BMD across-the-board. BMD system designs have evolved which adequately handle the problems of radar blackout and vulnerability to direct attack by employing multiple radars which can now be built at relatively low unit costs. With respect to discrimination, techniques have been perfected to confidently differentiate between decoys and RVs by employing multiple discriminants.

LoADS is considered a low risk development because of the extensive validation testing accomplished over the past several years on the Terminal Defense (Site Defense) concept. Unlike previous BMD systems, LoADS is relatively simple, the required technology is well developed and the mission is bounded. Further, the application of LoADS to defense of MX is less demanding than the previous BMD missions, of city and Minuteman defense, that were discussed during the ABM debate. This is so because of the leverage provided by multiple protective shelters (MPS) and the small area to be defended by each defense unit. In defense of a city a BMD system must be capable of intercepting essentially all reentry vehicles, in defense of Minuteman, the intercept requirements are greatly relaxed but are still challenging, while in the case of MX-MPS defense, only about [deleted] of the reentry vehicles attacking the MX missiles need to be intercepted and they are only 1/23 of the total attack.

## LoADS COSTS

Senator Garn: How much would it cost and how soon could we deploy a LoADS defense of a 4600 shelter/200 missile system?

Answer: The present LoADS pre-prototype demonstration (PPD) program will support a BMD (MX defense) initial operational capability of April [deleted] with full operational capability at all MX sites [deleted] later. This leadtime has been determined by an assessment of when a BMD for MX might be needed and is not limited by BMD technology. LoADS is funded at a level to support the timely development. The July 1979 cost baseline for the development of LoADS and the deployment of 200 defense units ([deleted] per defense unit) is $6.1 billion in FY 80 $ (not including DoE warhead costs). A program option has been developed which would allow deployment of LoADS [deleted]. The total cost of this option is essentially the same as the baseline program. However, the earlier deployment option requires significantly more funding in the next few fiscal years than the current program.

## LAYERED DEFENSE

Senator Garn: Could you discuss the cost-effectiveness of a layered defense ABM system for defending Minuteman III? How soon could we deploy an effective ABM defense of Minuteman III?

Answer: The layered defense system consists of an overlay of exoatmospheric interceptors with multiple non-nuclear kill vehicles and long wave infrared sensors for detection and tracking of the threat and either LoADS or an improved Site Defense underlay. The layered defense concept appears to be the most cost effective concept of Soviet RVs. When the first quarter of the shelters are deployed, what percentage of the MX shelters would we expect to survive an attack by the specified number of RVs? What about when the first half of the shelters are deployed? The first 75%?

Answer: Assuming the baseline threat, we would need approximately [deleted] the planned system deployed before we see any significant number of surviving shelters. From that point on, any shelters which we deploy would equate, one-for-one, to surviving shelters. Specifically, when the first [deleted] of the shelters are deployed we would expect [deleted] M-X warheads to survive if the Soviets use a reasonable fraction of their force against other targets. When the M-X deployment is completed, we would expect about [deleted] the M-X warheads to survive under the same assumptions.

Senator Garn: Would a substantial increase in the Soviet ICBM threat force us to respond in some way in order for us to retain confidence that the required number of MX RVs would survive? What types of responses could we make?

Answer: A substantial increase in the Soviet ICBM threat, such as might be possible in the absence of SALT II, could cause us to consider modifying the baseline M-X system. Responses that we would consider in the face of such a threat would include an increased deployment of M-X missiles, an increase in the number of shelters, and the deployment of an ABM defense.

## ABM FOR MX

Senator Garn: Under what circumstances should we deploy an ABM system to defend MX?

Answer: If the SALT process were to be discontinued and the Soviet threat to MX were to grow well beyond the current projections, active defense of MX based in multiple protective shelters should be considered as a means to assure the survival of our ICBM forces.

## LoADS - DEFENSE OF MX

Senator Garn: I've been hearing a lot in the last few months about deploying the Low Altitude Defense System, or LoADS, ABM to defend MX. I want to ask a few questions about LoADS.

Would LoADS be effective in defending a deceptively-based MX?

Answer: LoADS is a particularly attractive option to extend the survivability of MX should there be a very large growth in the Soviet threat and exploits the deceptive basing of MX to enhance the effectiveness of BMD. In the case of an MX deployment in Multiple Protective Shelters (MPS), a LoADS deployment which provides a single intercept per MX would double the attack level required to achieve a given destruction of MX. Therefore, the addition of defense is the equivalent of doubling the number of MX shelters but appears to be less costly for large threats and does not require additional land.

## FEASIBILITY OF ABM

Senator Garn: In the ABM debate of the late 1960s, a key argument against SAFEGUARD was that it wouldn't work. I suspect that the situation has changed since then, but what arguments could I use to convince a colleague that ABMs generally, and LoADS in particular, would work?

that has been formulated for defending a large number of fixed targets, such as Minuteman. However, the key elements of the concept, the overlay system components, [deleted].

Therefore, any estimates of cost, and effectiveness are highly uncertain. The BMD Program Office has estimated that a defense to provide [deleted] surviving missiles for attacks of up to [deleted] reentry vehicles would cost approximately $15 billion in FY 1979 dollars.

Some of the key technical capabilities of the overlay interceptor will be validated in the Homing Overlay Experiment flight program in [deleted] and other capabilities will be ground tested under the Forward Acquisition Sensor Program by [deleted]. At that time a system development could begin. A layered defense system could not be deployed before [deleted]. To achieve that date would require increased funding of the current technology efforts and would represent a high technical risk.

Effective defense of fixed silos, such as the Minuteman III deployment, is a more difficult task even with a layered defense than defense of MX based in multiple protective shelters (MPS) because the BMD system for MX can exploit the 23:1 leverage from the multiple shelters. In the case of a Minuteman defense, the location of the defense components is known and there are fewer targets to be attacked so the attacking force can concentrate its resources on the defense.

## PROJECTILE ABM SYSTEMS

Senator Garn: Do you believe that the "pellet fan projector" proposed by Richard Garwin or the "porcupine" proposed by Francis Hoeber have merit for protecting MX or Minuteman? We are told that the Army convened a panel in November 1978 to study this system in detail, and that the panel had several criticisms: The system would work only for a limited scenario; the darts could be targeted only over a limited angle; and the shock wave from the propelling explosion would cause the end of the darts to break off. We would like to consider each of these criticisms in turn.

Answer: These systems have the potential merit of apparent simplicity, which could allow them to be readily or rapidly manufacturable. They suffer, however, from a multitude of technical problems associated with firing mechanisms, inflight stability, target error volume saturation and lethality, as well as vulnerability to offensive precursors. Moreover the systems are costly when the supporting sensors and the total number of munitions required to achieve a reasonable probability of kill are considered. Therefore, these systems, and most others in their class that have been analyzed, do not have merit for MX or Minuteman defense.

## UTILITY OF PROJECTILE ABM SYSTEMS

Senator Garn: Isn't there value in deploying an ABM of this type that would only defend ICBMs? How much would it cost to deploy such a system, and how quickly could it be deployed?

Answer: The only likely role of this type of defense would be tc defend hard point targets such as ICBMs; however, more conventional approaches such as LoAD appear to be far superior. It is possible that projectile systems could be deployed in a manner that would be effective at low altitudes against small threats (one or two RVs per target) but we are already facing threats that could be larger than these systems would effectively counter. All projectile systems investigated to date share common technical problems. They have limited fields of fire which force considerable hardening and/or deployment of very large numbers of components. The costs are heavily dependent upon the nature of the target complex to be engaged but most responsible estimates have been several billion dollars for systems to counter non-responsive threats. Most systems of this type can be countered at a cost of an additional reentry vehicle per target in a relatively short time. The deployment times for most of the concepts, assuming that limited system performance is acceptable, could be relatively short; in most cases a few years.

## COVERAGE OF PROJECTILE ABM SYSTEMS

Senator Garn: Does the system need to cover a wide angle? If so, might it not be possible to mount the explosive and darts or pellets on a large tub resembling a searchlight so that the unit could be aimed over a wide angle?

Answer: Due to the low altitude of engagement and the width of the threat corridor, these projectile systems must cover a wide angle. It is possible to mount the system on "directable" mounting platforms but this would represent a significant increase in system complexity. For example, the proposed porcupine munition weighs approximately 12 tons which introduces additional issues that must be resolved, i.e., maneuverability, response time, aiming accuracy and remote control. This entire structure must be able to withstand a nuclear blast at close range because of the limited range of the defense system.

## DESIGN OF PROJECTILE ABM SYSTEMS

Senator Garn: Is it beyond American ingenuity to design a dart or a pellet that will not disintegrate on launch?

Answer: The pellet is generally not an acceptable projectile because of poor flight dynamics and lethality but it is survivable. A survivable dart can be designed; however, there are still severe problems associated with flight dynamics, aiming, and lethality that must be resolved.

Many of the simple systems that have been proposed have not been analyzed by their advocates beyond the level of a sketch, indeed in most cases only a concept for a munition has been proposed rather than a system. An attempt has been made in every case to provide a complete system definition, perform an objective analysis and seek means of eliminating deficiencies. We are continuing this process [deleted].

## OFFENSE/DEFENSE COUNTERMEASURES

Senator Garn: Any weapon system begets countermeasures. ABM is the counter to ballistic missiles. What counter could be devised against ABMs? How confident could we be that ABMs would work well in defending MX or Minuteman?

Answer: ABMs can be countered by tactics, or hardware fixes. Tactics include exhaustion--simply pumping in more RVs than there are interceptor missiles and supporting radars. Hardware fixes include pen aids, hardening RVs to various levels of nuclear threats, and maneuvering RVs. [Deleted.] The Trident I system could be deployed with the Mk-500 Evader MaRV in order to defeat an ABM interceptor. The Advanced Ballistic Reentry Systems (ABRES) Program is the national program for developing penetration devices and techniques. Thus, we feel we are ahead of the Soviets in this area.

A U.S. ABM deployment is technically subject to the same countermeasures. [Deleted.]

We have high confidence that we could develop a system to defend MX because of the tremendous leverage gained by the fact that the Soviets would have to target every shelter while we only have to defend the one shelter out of 23 which contains 1 missile. Defense of Minuteman would be much more difficult.

## ABM DILEMMAS

Senator Garn: ABM systems appear to raise some dilemmas that we would like you to comment on. First, an effective ABM defense of MINUTEMAN, whether using simple, conventional, or exotic ABMs, would reduce MINUTEMAN vulnerability, the concern driving us to deploy MX. If we could deploy an effective ABM defense of MINUTEMAN by 1990, could we forego deploying MX? Second, if we could deploy an ABM defense of MX or MINUTEMAN, the Soviets could do likewise. In that case, we would have little confidence in our ability to destroy hardened targets in the Soviet Union even with MX. In that case, would it still be to our advantage to deploy MX? Third, if the Soviets deploy an ABM, wouldn't that reduce our confidence in the ability of our submarine launched missiles to penetrate to their targets? Would that consideration make it worth our while to forego deploying an ABM if so doing would lead the Soviets to do likewise?

Answer: ABM is not a substitute for MX. A new ICBM System (MX) and the associated multiple protective structures (MPS) basing mode is the only concept for increasing ICBM survivability that has the required force characteristics yet can be built at a reasonable cost. In the event of unconstrained growth in the Soviet threat, it may be desirable to combine MX and ABM to meet our survivability objectives. An MPS basing system is uniquely suited to protection by ABMs since it is necessary for the attacker to target every shelter, while we need defend only the small fraction of shelters which contain missiles. Defense of MINUTEMAN is much more costly and would involve high technical risk.

If the Soviet Union were to deploy an ABM system, we would still have confidence in the ability of MX to destroy hard targets through the use of chaff, decoys and other penetration aids that we have developed and tested through the Advanced Ballistic Reentry Systems Program (ABRES) combined with tactics such as saturation. Our SLBM force could be equipped with MK-500 maneuvering reentry vehicles and other penetration aids as well and the defended area could also be saturated with MK-4 reentry vehicles.

Both the U.S. and Soviet Union agreed to forego any significant ABM deployments when they signed the 1972 ABM Treaty. We still support the limitation of strategic arms and would consider ABM deployment only if the SALT process were to fail and the Soviets continued to proliferate offensive weapons.

## ABM TREATY LIMITS

Senator Garn: Could we deploy a reasonably effective ABM defense of MX or of MINUTEMAN III that would be consistent with the SALT I ABM Treaty?

Answer: The current restrictions in the ABM Treaty preclude deployment of an effective BMD system to defend either MX or

**MINUTEMAN. The 1972 ABM Treaty sets a limit of one ICBM defense site of 20 ABM radars, 100 interceptors and 100 launchers. It would be necessary to modify the ABM Treaty to allow a larger siting area, more radars and more interceptors in order to provide an effective defense of our ICBM forces.**

## HIGH ENERGY LASER BMD

Senator Garn: What is the state of the art for the use of high energy lasers for ballistic missile defense? A recent New York Times article cited a "Senate aide familiar with current research on lasers" as arguing that the United States could, by spending large sums of money, deploy a space-based laser ballistic missile defense system by 1983 that could destroy 1000 missiles in 20 minutes. When do you think we could deploy an effective space-based laser ballistic missile defense system, and how much do you think it would cost? Do you see much promise for particle beam weapons? When do you think they could be deployed in an ABM mode?

Answer: To be effective high energy lasers (HEL) in any future BMD systems is that of destroying Soviet missiles (both ICBM and SLBM) during their boost phase prior to the deployment of the individual reentry vehicles. This concept requires the placement of the HEL weapons on space platforms (i.e., satellites). In order to insure continuous coverage of the Soviet launch area, a large number of satellites would be required since only a small fraction of these satellites could be in the proper position at any one time to engage all potential Soviet boosters. The number of satellites that are required to be in the "killing" position is primarily determined by the number of boosters launched, the length of time available to accomplish the kill, [deleted] of the laser system. A stand alone space-based HEL system would have to kill a very high percentage of the Soviet ICBM and SLBM forces to be effective.

A major factor in sizing the HEL system is the [deleted] laser radiation; at present this cannot be accurately assessed. [Deleted] a critical factor in determining [deleted] of the individual HEL devices, number of devices required to be in the "killing" position at a given point in time, and system effectiveness.

To date, no complete systems analysis of an HEL-BMD system has been conducted; analyses have focused upon the technology performance requirements in specific technologies, [deleted]. Based upon the current assessment of the state-of-the-art we are probably [deleted] away from demonstrating a space-based HEL system. The cost of a space-based HEL system will depend on the number of satellites required and a number of other unknown factors so a responsible estimate cannot be made at this time.

Particle beam weapon concepts, like high energy laser concepts, are attractive since they offer the potential of destroying Soviet ICBM and SLBM forces during the early part of their trajectory. The technology associated with particle beams, however, is [deleted].

## Soviet ABM Threatens SLBMs

Senator Garn: Herbert Scoville, Jr., has argued recently that "If the Soviets were free to deploy ABMs, this could undermine confidence in the submarine missile component of our deterrent triad as well as the ICBM one." How do you respond to this argument?

Answer: Whether a Soviet ABM would seriously threaten our SLBMs depends on the characteristics of the ABM. We have developed the Mk-500 Evader MaRV to counter an ABM system and could also use penetration aids such as chaff and decoys. While we have no plans at this time to deploy the Mk-500, we will continue to test it in order to reduce the lead time should deployment appear desirable. Since confident protection of either cities or fixed silos with ABMs is exceedingly difficult our confidence in our SLBM force will not be undermined.

### Minuteman Parking Orbit

Senator Garn: There has been speculation recently about the so-called "cruise ballistic missile" and the placing of Minuteman II reentry vehicles in a parking orbit on receipt of tactical warning of nuclear attack. In theory, we could protect ICBMs by launching them, yet could avoid committing them on launch. Would either of these be desirable? Is there any realistic prospect of acquiring the technology they require within the foreseeable future?

Answer: The study of cruise ballistic missiles is in the conceptual stage; we do not understand enough of its advantages or limitations to commit to it as a viable concept. Putting Minuteman into parking orbits has been studied more extensively and has been rejected. The adverse Soviet reaction from a launch reacting to a set of circumstances which did not include an actual Soviet attack is undesirable. Specifically, we worry that our launch, though only protective, would result in their launch against us. These are policy and procedural objections. Technical objections include the problem of what to do with a warhead that, because of technical problems during the launch phase, entered into a bad orbit which results in an uncommanded reentry at a time and place not of our choosing. Since the force that was launched into a protective orbit could not be recovered (conceivably the warheads alone might be recovered from the ocean), very valuable assets would be wasted in responding to a false alarm. Finally, testing of Minuteman in a parking orbit would be inconsistent with Article IV of the Outer Space Treaty in which the States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

### Orbiting System Problems

Senator Garn: These systems would require command, control, and communications technology far more advanced than anything we have yet deployed. We would demand the certain ability to control the missile without fear of jamming. Otherwise, we might launch ICBMs and be unable to arm or disarm them, as the case may be, with important consequences either way. If we could have this extreme confidence, could we count on the Soviets not being able to do likewise? If they had this capability, could they not retarget their missiles in real time? Wouldn't that capability enable time to defeat the MX racetrack system by launching a small attack, flushing the transporter-erector-launcher vehicles with their MXs out in the open and then into another shelter, using satellites to determine the new location of the missiles, and then using that satellite information to retarget their ICBMs that were already in flight?

Answer: Your question, Senator Garn, identifies all the elements of why these systems are not practical: tremendously technically advanced command, control, and communications; absolute anti-jam features; arm and disarm controls. We do not have the confidence that these ideas would work, which is why we are not pursuing them. Even if the Soviets eventually developed an in-flight surveillance and retargeting capability, only those MX missiles which were programmed to dash would be susceptable. We would undoubtedly know that the Soviets had developed this capability and would alter our dash tactics.

### Launch on Warning

Senator Garn: Let us play the devil's advocate with a few questions on launch on warning. Wouldn't the command, control, and communications technology required for cruise ballistic missiles or Minuteman II in parking orbits permit us to launch on warning a portion of our ICBM force? What is wrong with using launch on warning as a cheap and quick fix to Minuteman vulnerability? In a recent article in International Security, Richard Garwin says: "I advocate both silo defense and launch under attack as counters to Minuteman vulnerability." He further says:

> "The purpose of launch under attack or launch on impact is to *deter* attack on the ICBM force, *not* actually to save the ICBMs from destruction if they are in fact attacked; but these capabilities can deter attack only if they are *in fact* capable of "saving" the ICBM force by allowing it to be *launched* before it is destroyed."

He goes on to say that launch on warning has several technical requirements, and suggests that the capability receive serious attention. How do you respond?

Answer: Launch on warning or launch under attack has been, and is an option available to the National Command Authorities. However, to depend on it completely without providing any other options leads to a flawed, hair trigger policy. We must anticipate that an attack on the U.S. would include attacks on the warning system. It is perhaps possible that in some cases which we cannot anticipate, an attack on the warning system would not provide unambiguous information that an attack was in progress. This would place the NCA in an untenable position with the "warning systems out." It is for this reason that we cannot rely on LUA or LOW, but must provide other options of which MX is one that is independent of warning systems. The LUA/LOW option is always there for the NCA to use if necessary, and the clear availability of such an option creates enough uncertainty in the Soviet mind as to offer an additional measure of deterrence.

### Other Quick Fixes

Senator Garn: What other kinds of quick fixes should we undertake?

Answer: Required improvements to our strategic forces have been proposed in the budget now before the Congress.

### Mobile Minuteman

Senator Garn: Would it make sense to deploy Minuteman III in a mobile mode until we can deploy MX? How long would it take to start up the production line and produce new fixed-site Minuteman

IIIs? How long would it take to convert existing Minuteman IIIs to a mobile configuration?

Answer: It would not make sense to deploy Minuteman III in a mobile mode. The high cost, decrease in effectiveness, and questionable survivability make this a very unattractive proposal. The time to convert Minuteman III to a mobile mode would depend on which of the several different proposals were adopted.

## TRIAD VS DYAD

Question: Could you discuss the advantages of maintaining a strategic Triad? What military problems might occur with an augmented diad if we choose to forego our land-based ICBMs?

Answer: The underlying philosophy of the Triad is to present an enemy contemplating a disarming strike with insurmountable challenges. The Triad uses a variety of methods for basing, delivery, and penetration-modes which, to the extent possible, significantly differ. To be successful, the Soviets must succeed in countering not one, but many entirely different kinds of systems. Our strategic aircraft rely on warning and speed for pre-launch survivability and on low altitude flight, electronic countermeasures, and defense suppression for penetration. Submarines use concealment to survive and have short launch-to-target flight times. A large number of survivable ICBMs in protective shelters cannot be attacked without massive, attacks on US territory and this force can respond rapidly and flexibly with weapons that penetrate with great speed and accuracy. Thus, to execute a successful first strike against our forces would require one to simulanteously attack these diverse systems portions of which are dispersed, concealed, hardened, fast and mobile, --an extremely difficult attack. Likewise, the varying times penetration modes, velocities, and angles-of-arrival with which US Triad forces could retaliate against the Soviet Union, confront the Soviets with an overwhelmingly difficult defensive task. Taken together, the Triad elements guarantee any attacker a retaliatory response which would deny him any prospect of rectory and would inflict unacceptable damage on him. This is the key to deterrence.

The existence of a Triad of forces also provides an important hedge against catastrophic failure, communication breakdown, or technological breakthroughs which would incapacitate one or more legs. The number of weapons in each leg is structured so that any two elements can accomplish our retaliatory damage objectives. One leg by itself can do considerable damage. Having three independent legs precludes the successful neutralization of our stategic forces. This hedge extends to the peacetime operation of our forces as well, by allowing us to cope with temporary technological deficiencies in any one leg in an orderly manner.

Equally effective Triads and Dyads have similar long-term costs. More importantly, a Triad has additional attributes, not possessed by a Dyad, that increase confidence in the capability to deter attack. Reliance on a Dyad would sacrifice much of the diversity in modes of survival and penetration that have enabled our forces to deter attack. Much our capability to hedge against future technological breakthroughs resulting in either partial or catastrophic failure of a Triad leg would be lost by shifting to a Dyad. Finally, loss of a survivable ICBM capability would deny us a secure retaliatory force with key ICBM characteristics such as proven commend-control-communications and the ability to attack hardened targets in a timely manner. Moreover, in abandoning a survivable land-based ICBM capability in the face of Soviet force improvements, we would be widely perceived by friend and foe alike as acquiescing to Soviet dominance in this crucial area. Such a decision would have far-reaching political, diplomatic, and military effects.

### Window of Vulnerability

Senator Garn: Please discuss the consequences and risks of leaving a window of vulnerability between 1982 (when the Soviets are expected to be able to destroy most U.S. ICBMs) and 1989 (when MX deployment is scheduled to be completed). Can we afford to wait until 1989 to have MX completely deployed? Do you expect that MX will be completed by 1989? Do you expect that we will need to deploy more than 4600 shelters and 200 MX missiles by 1989? If the Soviets add anRV for each shelter we build, and we deploy only 200 MX missiles, would we ever be able to reach a point at which we have high confidence that half of our MX RVs would be able to survive a Soviet attack?

Answer: There are some risks, but they are not critical. The bomber/cruise missile and SLBM forces will carry us through this decade until MX is completely deployed. However, the fact that we can tolerate this risk temporarily does not mean we can forego MX; improvements in Soviet air defenses may place cruise missiles at risk in the 1990s, and Soviet ASW breakthroughs, while unlikely, could jeopardize the SSBNs in the 1990s.

We do expect MX to be completed by 1989. Once we begin deployment, the learning curve effect will begin to prevail. Today, we do not expect to have to deploy more than 4600 shelters. If the Soviets add an RV for every shelter we build, they would either have to abrogate the SALT II treaty limit on ICBM launchers or fractionization, and enter a massive development program to support that approach, or else earmark all their RVs to MX. At some point their confidence in being able to attack MX has to become questionable vis-a-vis the cost and complexity. We can, as we have said before, deploy an MX system that will make more than half our RVs survive.

### MX and Stability

Senator Garn: Some MX opponents argue that, were the USSR to contemplate a first strike, it would face many operational difficulties -- fratricide, the possibility that the United States would launch its ICBMs on warning of attack, and so on. As a result, these critics argue, the Soviets will never have enough confidence to strike first, we need not worry about Minuteman vulnerability, and Soviet ICBM accuracy is not destabilizing. At the same time, some MX critics also argue that MX deployment would be strategically destabilizing because its accuracy would permit it to destroy Soviet silo-based ICBMs, perhaps forcing the Soviets to take dangerous countermeasures such as a decision to launch their ICBMs on warning of a US attack. In this case, the argument assumes that the Soviets would not believe that the United States would face significant operational difficulties in executing a first strike. It would seem that one can't have it both ways. How do you assess the operational feasibility of carrying out a coordinated first strike? Do you see any significant drawbacks to deploying an extremely accurate MX? To what extent would you regard MX as destabilizing?

Answer: The execution of a coordinated disarming first strike poses formidable uncertainties and operational difficulties which cumulatively and detrimentally affect the likelihood of its success. The less likely success appears, the less likely it is that such a strike would be attempted. One way to reduce the likelihood of success is to diversify one's strategic retaliatory forces as the United States does in maintaining a strategic triad. An additional way is to maintain the survivability of retaliatory force components in such a way that an enemy would exhaust his arsenal in a first strike and still not achieve success. We are pursuing both approaches through preservation of the triad and MPS basing for MX.

A danger always will exist, however, in that the Soviets might underestimate the survival potential of US strategic forces, overestimate their own ability to carry out such a strike, and attempt one. The possibility of such an event cannot be discounted merely on the basis of attack complexity. The ability to maintain a survivable retaliatory force must be visible and unequivocal. It must recognizably deny the Soviets attainment of the objectives of a first strike and, at the same time, provide a force capable of denying the Soviets a subsequent victory or of imposing costs that they would be unwilling to accept.

In order to accomplish this last goal, a surviving US force must contain highly accurate weapons capable of prompt response under a variety of wartime conditions. As long as US and Soviet forces are essentially equivalent, such a surviving US capability should contribute to stability rather than detract from it. The dangers to stability are greater from an imbalance in which one side appears to have a decisive first strike advantage. Deploying an accurate, survivable MX will maintain a balance in the face of Soviet force increases and forecast improvements. It will not give the US a decisive first strike advantage since this would be more a function of the number of missiles deployed than of the properties of accuracy and prompt response.

It is not inevitable that Soviet responses to the planned MX deployment would invariably be destabilizing. The Soviets could react in a number of ways. Some of them might complicate future efforts at arms control, but not in ways that would produce insurmountable difficulties. Further, MX might prompt the Soviets to deploy more survivable ICBM systems of their own. A situation in which both sides are relatively invulnerable would certainly be much more desirable, and stabilizing than one in which systems of only one side, the US, are vulnerable. As long as each side maintains its ability to emerge from a first strike with surviving forces capable of retaliating with comparable effectiveness, equivalence and stability should be preserved and first strikes themselves effectively deterred.

## M-X ADVANTAGE

Question: What military advantages would we obtain uniquely with M-X?

Answer: The M-X in multiple protective shelters allows for continued survivability of the ICBM leg of our strategic Triad. This portion of our strategic forces provides a combination of characteristics which are unique: high accuracy; quick, flexible response; excellent, redundant command, control and communications; survivability independent of warning; and low operating costs.

The M-X in multiple protective shelters creates an unfavorable exchange ratio for the Soviets in that they would be compelled to expend a substantially larger number of reentry vehicles to destroy a given number of US ICBM reentry vehicles. This adverse exchange ratio insures that the Soviet Union's strategic position relative to the US would be worse after a counter ICBM exchange than it was prior to such an attack.

## M-X DETERRING A SOVIET ATTACK

Question: Isn't it the case, though, that M-X would do much to deter a Soviet attack in the first place and thus greatly reduce the risk of an attack? Can you describe the military problems facing a Soviet officer who has been ordered to draw up plans for an attack on M-X?

Answer: It is true that M-X with its multiple protective shelter basing mode should help deter any adversary from ever attacking the United States. M-X will be a capable retaliatory force which should effectively discourage attack because any attack on it would only shift the strategic nuclear balance sharply against the adversary.

The baseline M-X/MPS system deployment of 200 missiles in 4,600 shelters was selected to cope with the nominal late 80's Soviet threat projected in the National Intelligence Estimate (NIE). M-X/MPS presents the Soviets with a significantly adverse RV exchange ratio and an unfavorable postattack balance - it takes 4,600 RVs to attack the 2,000 M-X RVs, an RV exchange ratio of 2.3 to 1. As a result, the Soviet ICBM force is offset, and deterrence is enhanced by making an attack on U.S. ICBMs unprofitable.

The M-X/MPS system was also designed under the assumption that a very large Soviet ICBM threat could occur. Its fundamental goal is to deter an attack by confronting the Soviets with situations in which they would always have to expend substantially more of their ICBM RVs than the number of U.S. ICBM RVs they could expect to destroy. The M-X/MPS system will accommodate threat growth with modifications such as the construction of additional shelters, addition of more missiles, or some combination of the two. Moreover, it lends itself to deployment for a specially designed Ballistic Missile Defense (BMD) system that can provide high leverage protection for the M-X/MPS deployment. The existence of these response options should strongly reduce Soviet incentives to deploy additional ICBM weapons for the purpose of attacking M-X.

## SOVIET FIREPOWER VERSUS SURVIVABILITY

Question: Do you expect that deploying M-X will force the Soviets to spend less on ICBM firepower and more on ICBM survivability?

Answer: When considering the possibility of expanded Soviet firepower, it is important to note that the counterforce capability of M-X will provide a very substantial disincentive to the Soviets to further expand their ICBM force by deploying new missiles in fixed silos carrying increased numbers of RVs. A U.S. counterforce attack using the M-X on Soviet current generation, silo-based MIRVed ICBMs would confront the Soviets with an adverse exchange ratio on the order of from 6:1 to 10:1. That is, 6 to 10 Soviet RVs could be destroyed for each M-X RV expended. It would appear that a rational Soviet planner would be forced to think very hard before deciding to fractionate his ICBM payloads further (to 20-30 RVs on an SS-18 class missile, for example), and deploy the new missiles in fixed silos since this would simply confront him with an even more adverse exchange ratio. Faced with a U.S. M-X/MPS deployment, the Soviets would be much more likely to undertake measures to improve the survivability of their own ICBMs, through some mobile deployment configuration, for example, rather than taking steps that would only place a larger number of ICBM weapons at risk.

## COMMON MISSILE

Question: Would it make sense to deploy a common missile, using the Trident II booster for M-X and Trident II?

Answer: After complete and detailed analysis, we concluded that the disadvantages of a common missile outweighed the potential advantages by a rather wide margin. The reduced throwweight capacity of the common missile (due to the physical constraints of the Trident submarine launch tube), the increased complexity of the dual development program, and the use of common components with common failure modes in two elements of the Triad were the principal factors in the Administration's decision to pursue the full size M-X missile rather than a common variant.

## INTERIM SOLUTIONS

Question: Secretary Brown stated in his FY81 Defense Department Annual Report that "within another year or two, we can expect the Soviets to have the necessary combination of ICBM reliability, numbers, warhead yields, and accuracies to put most of our Minuteman and Titan silos at risk." (p. 6) Yet M-X will not be fully deployed until September 1989, leaving a window of vulnerability of nearly a decade. Do you recommend any short-term measures to offset this problem?

Answer: We have examined many so-called interim measures to offset the growing vulnerability of silo-based ICBMs in the early 1980s. These measures are disproportionately expensive relative to the capability they might add to our deterrent, particularly in light of our urgent requirements to meet our critical personnel retention needs and to improve the near term readiness, sustainability, and mobility of our general purpose forces in the wake of recent events in Southwest Asia. Moreover, the resiliency of the other two elements of the Triad preclude the necessity for precipitous action to restore ICBM survivability. While we are doing everything reasonable to achieve early resolution of this issue, we believe moving ahead with M-X at the fastest pace possible represents our best response to our strategic force requirements.

## STEVENS AMENDMENT

Question: What is the Air Force doing to comply with the Stevens Amendment to the FY80 Defense Appropriations Act that forbids a commitment to any single basing mode? What would be the consequence of passing the same legislation for FY 1981?

Answer: The Stevens Amendment to the FY 80 Defense Appropriation Act directed the Department of Defense to consider various basing design alternatives for M-X. Accordingly, the M-X Program Office has studied numerous design alternatives during FY 80, all within the general framework of the Multiple Protective Shelter concept authorized by the President. The conclusion of these studies is that the basic design for M-X should be retained. Our engineering analyses identified technical refinements, however, that would reduce the expense and the complexity of the system, but would retain high levels of survivability, military operational benefits, and verifiability. We intend to adopt these design refinements immediately.

To continue into FY 1981 with legislation similar to the Stevens Amendment would surely slip the IOC for this program. Parallel basing alternatives could be fully pursued - a course of action which would result in substantially higher cost and schedule risks.

## RATE OF CONSTRUCTION

Question: I'm also concerned about the rate of shelter construction, for if the Soviets can add RVs faster than we can add shelters, they could, by spending the required resources, deploy enough RVs to overwhelm MX. How fast could we build shelters? Are you confident that we can build shelters as fast as they can build RVs? In the event of such a Soviet breakout, would it not be more cost-effective for us to deploy an ABM system to protect MX?

Answer: Our latest estimates on the maximum rate the Soviets could deploy additional RVs, without SALT II, which would involve their shifting weapons-grade nuclear material production from all other efforts, and an extremely high risk technical development program, is [deleted] warheads/year during the period [deleted]. Our present baseline shelter deployment schedule is 1,150 per year, while accelerated operations could produce 2000 per year during the same period. If a true Soviet "breakout" occurs, involving a massive expansion of their RV inventory, a specially designed active defense (ABM) system could be deployed in the most cost-effective shelter/defense mixture. The baseline MX program will provide Soviet missile/US shelter parity in [deleted] against the likely Soviet threat. Accelerated construction, by both sides could produce this "shelter-parity" slightly sooner, that is, in early [deleted].

## COST OF SHELTERS AND RVS

Question: Secretary Brown, in a press conference of September 7, 1979, said:

> If the Soviets were to, either at the end of SALT or because SALT fails, to fractionate their missiles further so instead of having a maximum of 10, they have 20 or 30 on a missile, then we would add shelters, which we can do at about the same cost as it costs them to put in an additional reentry vehicle.

What is the basis for the assertion that M-X shelters will cost about the same as Soviet RVs? If the Soviets deploy 30 RVs per SS-18, would it still cost us as much to build a shelter as for the Soviets to add an RV, considering that the cost of the missile booster would be split among 30 instead of 10 RVs? How much will we have spent through FY 1980 to study building shelters as cheaply as possible?

Answer: In order to appreciate the economics of a No-SAL ICBM arms race we have, in the accompanying Figure, shown estimates of historical cost data and projections of estimated future cost data. The costs shown exclude nuclear material costs. We note that the present imbalance in ICBM capabilities was brought about by the Soviets investing roughly $8 billion per year from 1970 to 1980 when the United States was investing at a rate of less than $2 billion per year.

[Deleted.]

We have estimated the magnitude of the future dollar costs that would be associated with the ICBM forces projected in the NIE on the basis of projected U.S. costs of threat offsetting systems. Research, development, procurement, and operations and support (O&S) costs have been estimated. A comparison of these estimates to the costs of M-X/MPS system responses provides a perspective as to whether the M-X/MPS system can be overcome by the Soviets at a favorable cost exchange ratio.

[Deleted.]

## M-X AND HIGH SOVIET THREATS

Question: An article in Air Force magazine of April 1980 asserts that an M-X system augmented with ABMs, additional shelters and missiles, and additional RVs per missile, "could survive an attack by 20,000 RVs." In a similar vein, the New York Times reported:

> A new estimate by the Central Intelligence Agency is said to have concluded that without the new arms treaty, which could limit warhead numbers, Soviet missiles could be adapted to deliver between 20,000 and 30,000 nuclear bombs before 1990.

What capability might the Soviets have to deploy such a force of 20,000 or 30,000 warheads which could be accurate enough to threaten M-X? What M-X force would be needed to survive an attack by 20,000 Soviet RVs? How many missiles, shelters, M-X RVs, and ABMs would we need? How much would that system cost, and how soon could we deploy it?

Answer: [Deleted.]

## VERTICAL SHELTER

Question: I have been told the M-X could be removed from a vertical shelter in 1/2 hour vs. 10 minutes for the horizontal loading dock, and that the loading dock with portals will have only about 50 psi hardness. So, would it not be desirable to deploy vertical shelters, as the Air Force proposed a year ago?

Answer: For the past several months, the Air Force has been analyzing and testing vertical shelter ingess/egress operations at our engineering test bed in Nevada. The results have not been promising in that the total transaction time from one shelter to another remains on the order of 1 1/2 hours, not 1/2 hour. This compares unfavorably to the 7-15 minutes possible with the horizontal shelter system. As a result, we would not be able to rapidly reconfigure the vertical shelter system. Thus, it would rely totally on concealment for survivability as opposed to the horizontal shelter system whose concealment mode is significantly enhanced by rapid mobility.

With regards to shelter portals to facilitate SAL verification, we believe we can construct the horizontal shelters with or without the portals and achieve the desired hardness.

## M-X VULNERABILITY

Question: I've heard it argued that the racetrack system would be vulnerable to various types of Soviet actions. Newsweek, for example, reported that the dash capability could be compromised as follows:

> The Pentagon now realizes that the Soviets could launch a small initial attack and then use spy satellites to spot the shelters to which the M-X's has dashed. A second wave of Soviet missiles could then be targeted on those shelters.

It this assessment correct? There has also been talk of nuclear pindown, of agents seeding the deployment area with sensors, even of agents launching or directing small missiles against the TELs. Could you explain how the Air Force plans to guard against such potential vulnerabilities?

Answer: With the engineering refinement which incorporates the separate transporter and missile erector-launcher, the transporter acts as a shield vehicle and would continually mask the presence of either a missile or simulator when the vehicle is in motion. Accordingly, the Soviets could never be sure of the location of the missiles, even when we are exercising a mobility option.

With regard to pindown, the M-X system is less susceptible to this tactic than other ICBM systems. Moreover, because of survivable basing, there would be no need to launch the missiles during a pindown attack. Accordingly, "pinning" the M-X would, in effect, waste a large portion of the Soviet's nuclear force, so much so, that we believe it is doubtful they would even consider a pindown tactic.

Various security measures will be employed to protect against implantation of sensors or other methods which might be employed to gather information on the location of the M-X missiles. A full complement of technical countermeasures will be developed, including mass simulators, which will either mask, eliminate, or simulate detectable signatures. Other measures such as "sweeping" the area for sensors and employing a "red team" to continually test the system will give us high confidence that the system can be concealed successfully. Nevertheless, a second mode of survivability -- mobility -- can and would be employed to counter any loss of concealment.

Finally, the security force associated with M-X should reduce significantly the probability of enemy agents being able to threaten an M-X transporter in motion. Nevertheless, we could not reduce the probability of sabotage to zero. Consequently, we would never place all of the missiles in motion at any one time. This reduces the incentive to employ high risk terrorist activities against the deployed M-X force.

## BARRAGE ATTACK OF M-X ALCC

Question: Is the press account accurate which cited Dr Perry as saying that the Soviets could explode nuclear weapons in mid-air to "destroy every airplane in half a million square miles?" If the Soviets can readily destroy aircraft in a circle with an 800 mile diameter, why are we using ALCCs at all, much less as our primary command link?

Answer: Although Dr Perry did state at the 25 March 80 Military Construction Subcommittee hearing that the Soviets were capable of a barrage attack that could destroy every airplane within a half million square miles, Dr Perry was referring to the potential vulnerability of U.S. bombers and aircraft carrying air launched ICBMs should the United States fail to deploy M-X. The point Dr Perry was making was that if the United States fails to deploy M-X the USSR will have sufficient discretionary resources to threaten U.S. bombers by the mid 1980s using a barrage tactic. Soviet ability to barrage large areas will be mitigated by M-X deployment. M-X will provide the U.S. a favorable exchange ratio and counterforce capability that will work synergistically with the other legs of the TRIAD not only to restore essential equivalence but to maintain it by denying the Soviets the opportunity to concentrate an attack of the other legs of the Triad.

With the deployment of M-X the potential vulnerability of M-X ALCC to barrage attack is very small. It would not be prudent for the Soviets to attempt to barrage the M-X ALCC because such an attack would greatly exacerbate the unfavorable weapons exchange ratio the Soviets face with M-X for the result of removing only one tier of M-X's comprehensive command control ($C^2$) structure. The M-X ALCC will be a second tier of $C^2$ system. The other tiers include, at a minimum, two dedicated ground control centers [deleted]. Additionally, we are exploring technological developments which could provide even further redundancy and greater confidence in M-X $C^2$. However, we regard the M-X ALCC as an important, cost effective $C^2$ element in all potential M-X $C^2$ systems because of the tremendous drain in Soviet resources required to defeat it. In this regard the M-X ALCC fits the basic M-X objective of developing a system which cannot be attacked without shifting the strategic balance sharply against the attacker.

## SOVIET PINDOWN TACTIC

Question: I have heard it argued that the Soviets could launch submarine missiles to "pin down" our M-X force, preventing us from launching it before the Soviets could destroy it with ICBMs. How do you respond to that argument?

Answer: Regarding pindown, with the M-X because of survivable basing, there would be no need to launch our M-X missiles during a pindown attack. Accordingly "pinning" the M-X would, in effect, waste a large portion of the Soviet SLBM force, so much so that we believe it is doubtful that they would ever attempt to employ the tactic.

## Impact of MX System on the Citizens of Nevada and Utah

Senator Garn: In the absence of more detailed information on the location of bases and the mode of deployment-configuration, only a limited number of things can be done to begin actual preparation for mitigating the socio-economic and environmental impact of the MX in Utah. However, there are a number of things which prior experience in these areas indicated should be looked at immediately.

My question to you Secretary Brown, is, regarding the capital financing process for acquiring socio-economic impact funding, what are your feelings regarding including all socio-economic funding in the Defense budget for MX, and having this money administered directly from the Office of the Secretary of Defense?

Answer: We are concerned about the potential local impact of the MX system on the citizens of Nevada and Utah, but I would not prefer this approach to socio-economic funding.

Historically, we have relied on the appropriate other federal agencies to provide impact assistance to offset the consequences of Defense program changes. By reason of these agencies' charters, statutory responsibilities, substantive experience and technical expertise, they are much better positioned than is DoD to respond to these impacts. For a number of years this federal assistance has been provided through the Economic Adjustment Committee (EAC) -- which includes 18 federal departments and agencies and which I chair. The committee's task is to ensure a timely and coordinated federal response to the needs of Defense impacted communities, using the budgetary resources of its member agencies. Our experience with this mechanism has been very favorable and reassuring, and I see no reason to depart from its use in the case of MX at this time. We will, of course, keep an open mind on all such matters for future purposes.

I would note that funds for economic adjustment planning assistance for the States of Nevada and Utah were included in the FY 80 Defense budget, and that the House Appropriations Committee has proposed additional planning funds for FY 1981. Early planning is one of the most critical steps in any large assistance effort and I view its support a worthy application of DoD funds. I would expect that the results of this early planning will enable EAC agencies to subsequently budget and program funds for more direct forms of impact assistance, including capital financing.

## M-X IMPACT FUND PROCEDURES

Question: Is there a procedure/arrangement by which priority decisions can be expedited, regarding administration for M-X impact-funds?

Answer: Presidential Executive Order 12049 dated March 27, 1978, established the framework for coordinated Federal economic assistance necessitated by changes in Department of Defense activities. The Secretary of Defense, through the Economic Adjustment Committee (EAC), has the responsibility to design and establish an economic adjustment program to assist in the alleviation of serious economic and social impacts that result from major Defense activities such as M-X. The EAC has established a special M-X Task Force which is co-chaired by the Director of Office of Economic Adjustment (OEA) and a member of the Air Force Secretariat. The Air Force has established an M-X Environmental Council which is co-chaired by an OEA representative. The foregoing promotes a very responsive interrelationship between the White House, Federal Agencies, DOD and the Air Force regarding M-X matters. Small intergovernmental working groups are being formed to represent regional, state and local officials, OEA, and the Air Force. Proper organization will help streamline the fiscal impact assistance process. Good progress is being made in that regard. Compared to the Trident experience at Kitsap County, Washington, the M-X organization efforts are occuring at an earlier point in the program. Attention is also being focused on ways to improve the federal delivery system for M-X.

## M-X IMPACT MECHANISM

Question: Secretary Chayes, previous experience in defense-related impact mitigation -- specifically with regard to the Trident project in Kitsap County, Washington, indicates that a small, effective intergovernmental group must be established to prevent duplicative effort and to ensure accurate cost estimates from local, state and federal entities. So far, I have not been impressed that the organizational arrangements for handling M-X impact planning have been clearly defined by the DOD. What assurance can we have that there will be an effective mechanism by which to make the necessary difficult decisions related to M-X impacts and to follow-up rapidly with the needed funding?

Answer: As I have stated in answers to previous questions, the Air Force is in only the preliminary stages of planning for M-X impact assistance. Organizational structures are being created based on the valuable lessons learned from the Kitsap County experiences. Small intergovernmental working groups, representatives of state, local, and federal agencies, OEA, and the Air Force have already begun to meet. This degree of accomplishment was not achieved with the Trident program until its EIS was filed and the site selection was made. With M-X, neither the EIS nor site selection has been accomplished. Nevertheless, M-X has, at this early point in the program, substantially established effective intergovernmental working relations. Planning is a cooperative enterprise, and all parties have displayed positive attitudes thus far. The outlook is very good for producing an effective mechanism to identify and obtain impact funding.

## IMPACT AID

Question: Regarding the amount of impact aid for M-X, in the case of the Trident project in Kitsap County, Washington, a total assistance package of $103 million was allocated for a $1 billion project. This project called for an influx of 29,500 people into an area with a population base of 116,000 -- a 23% increase. Given this background, what formula will be used?

Answer: A formula has not been derived to determine the amount of impact aid for M-X. Extensive experience has shown that a valid parametric estimate can not be derived based on just population growth or program cost. A detailed fiscal impact analysis must be performed for the selected site to determine specific funding requirements and phasing. A deployment area selection decision is expected in December of this year, and the fiscal impact analysis would occur in 1981.

## ECONOMIC ADJUSTMENT ASSISTANCE PLAN

Question: Last November in field hearings, OEA Director William Sheehan was asked: "How long will it take you to develop an economic adjustment assistance plan?" The response he submitted to the record was: "If an economic adjustment program is initiated, general planning could take place immediately. But specific economic adjustment planning cannot begin until a final MX site

selection is announced. Following the announcement, a preliminary adjustment plan normally takes 120 to 180 days."
(Emphasis added.)

In this regard, please answer the following questions:

a. What is meant here by "a final MX site selection" -- base-siting or shelter-siting?

Answer: "Final site selection" refers to the choice which the President will make regarding the alternatives now under study for the physical location of MX operating bases, support centers and shelters.

b. When would the preliminary adjustment plan be developed?

Answer: Since the field hearings took place in November, the Secretary of Defense received requests for Economic Adjustment Committee (EAC) assistance from the Governors of Nevada and Utah. The Office of Economic Adjustment, in coordination with the Air Force, prepared a "Preliminary Framework For An Economic Adjustment Strategy" which was sent to the governors to serve as a basis for discussions aimed at developing cooperative local-state-federal economic adjustment planning and implementation activities. This "framework" which follows provides the sequence of activities which should take place.

## OFFICE OF ECONOMIC ADJUSTMENT

## PRELIMINARY FRAMEWORK FOR AN MX ECONOMIC ADJUSTMENT STRATEGY

- Objectives: Minimize adverse socio/economic effects
  Maximize economic benefits

- Assumptions: The strategy should:

  - assure the availability of community facilities and services in time to meet the demands created by the MX program.

  - foster strong intergovernmental cooperation.

  - provide for impacted communities to have a lead role, with timely state and federal support.

  - emphasize the role of the private sector.

  - protect local, state and federal interests.

  - include expeditious funding procedures.

  - recognize the present uncertainties in MX planning.

  - provide an appropriate response which will contribute to area development with or without the MX base.

  - be client-oriented (i.e. frequent direct contact with affected communities, travel to the affected area, provide an advocacy/ombudsman role within the federal executive branch).

  - be comprehensive to achieve balanced economic development

- Strategy Components:

  - Organization

  - Planning for Community Impact Assistance

  - Mobilization of Private Sector Resources

  - Implementation of Community Impact Assistance

- Organization: An organizational structure should be developed for the MX economic adjustment planning which clearly delineates responsibilities and provides a system of tight, streamlined coordination. It should facilitate rapid intergovernmental decision-making. To assist in developing this component OEA will:

  - establish an MX team of OEA functional specialists to deal with specific areas of concern.

  - formally notify the Economic Adjustment Committee (EAC) of the initiation of the MX project and establish an EAC Task Force for MX

Environmental and Community Impact Planning. The Task Force will be co-chaired by OEA and the Air Force to assure full integration of activities.

- request special White House/Office of Management and Budget direction to EAC members and Federal Regional Councils (FRCs) to add additional priority for MX-related activities.

- request that MX task forces be established in the Denver and San Francisco Federal Regional Councils, to be coordinated by OEA regional directors. Develop a mechanism to coordinate the approaches taken by both FRCs.

- in cooperation with the Air Force, assign additional field staff to reside in each state. These staff would assist the OEA regional directors in providing direct and continuous contact with the leaders of affected communities regarding economic adjustment matters.

- co-chair the Air Force MX Environmental Council to assure close coordination of MX base planning and economic adjustment planning activities.

- assist all MX project participants in forming an intergovernmental organizational structure which facilitates economic adjustment planning and implementation. A suggested structure is shown in the attachment.

- seek necessary funding resources to build state and local organizational capacity for meeting MX-related community growth requirements.

- inform the Congressional delegations from Nevada and Utah and appropriate Congressional committees regarding the MX economic adjustment program and maintain continuous communications. Provide support to the Air Force in MX hearings which include economic adjustment matters.

- intensify liaison activities with EAC agencies and private sector groups to increase the resource base for the MX project.

• Planning: Given the uncertainties surrounding MX base planning, current economic adjustment planning should be aimed at assessing and strengthening state and local institutional capacity; developing baseline data sources; creating and/or updating comprehensive community development plans; devising growth management policies; identifying and initiating needed legislative changes and developing an appropriate economic model for assessing anticipated fiscal impacts. More detailed planning for expanded capital facilities and services can occur as MX basing decisions are made. To the extent possible, planning should be an intergovernmental activity, with project participants agreeing to share responsibilities in a well-defined planning program. An attempt should be made to avoid duplication except where required to protect local, state and federal government interests. An attempt should also be made to reach agreement on planning assumptions, data, sources and methodology so that impact assistance will not be delayed by protracted negotiations over impact requirements.

To assist in planning, OEA will:

- maintain close contact with Air Force planning activities so that quick action can be taken in response to emerging requirements.

- assist the States and local governments in expediting responses to current requests for federal planning assistance.

- identify federal program resources (normal and discretionary) which can be of immediate assistance in planning activities.

- assist the State and local governments in identifying funding constraints and devising alternative approaches to overcome those constraints.

- assist in devising a planning program which integrates local, state and federal planning requirements; sets priorities and schedules; and identifies planning resources and responsibilities.

- obtain input to the MX EIS process from EAC agencies so that information will be generated to support technical assistance and funding requirements.

- encourage the creation of planning task forces in each state to address specific areas of concern such as housing, education, small business and manpower.

- prepare a preliminary comprehensive economic adjustment strategy for the potentially impacted areas of each state. Strategies would include a description of socio/economic characteristics; area development strengths and weaknesses; growth opportunities; anticipated MX growth impacts; and a recommended economic adjustment strategy and action plan for providing facilities and services in time to meet growth demands.

- engage OEA MX team specialists in project-related research and arrange a field visit to allow direct familiarization with the people, problems and resources related to their functional areas.

- conduct intergovernmental planning workshops in Utah and Nevada in mid-1980 to develop a programming and budgeting strategy for FY '82 to meet both planning and capital facilities requirements. EAC agency representatives would participate in the workshops and a more detailed written economic adjustment program report/strategy would be released shortly thereafter.

- work with the Air Force EIS contractor, States and local governments to develop an economic model for determining fiscal impacts. Development should be scheduled to allow input and analysis of Air Force basing data as it becomes available. The model should facilitate joint determination of fiscal requirements by all governmental participants and form the basis for federal funding requests, whether through existing agency programs or special legislation.

- assess the community impact assistance program in Kitsap County, Washington (Trident) and develop improved policies and procedures for possible application in the MX project. The intent is to develop a more rapid, streamlined response while protecting all interests involved.

- Private Sector: The MX basing will create substantial economic opportunities for the private sector. While the public sector has an important role in creating a proper environment for managed growth, private sector resources will provide the bulk of long term economic benefits. Most of these resources will be involved through the marketplace. To maximize the private sector contribution, OEA will assist in devising a private sector sub-strategy aimed at:

- identifying relevant resources in private foundations.

- encouraging heavy private sector participation in local and state MX economic adjustment organizations.

- identifying opportunities for new and expanded business and industry and ways to maximize exploitation of those opportunities by local, state and regional enterprises.

- identifying and resolving problems of capital formation.

- devising a program for economic diversification.

- assessing problems which rapid population growth will create for local businesses and devising a public/private sector approach to resolve them.

- identifying private development and financial resources outside the states which could be utilized when local capacity is deficient.

• Federal Impact Assistance: Dollar requirements and sources for federal funding to deal with MX growth impacts will be identified initially through a fiscal impact analysis and subsequently updated through an annual intergovernmental programming process. To assist in implementing actions to mitigate anticipated impacts, OEA will:

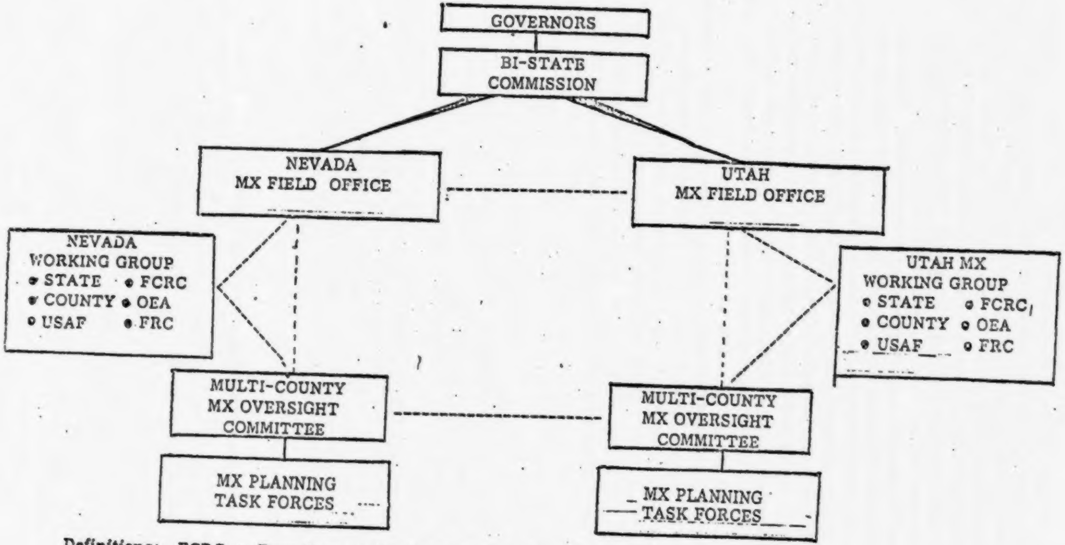
- work with EAC agencies to identify current funding requests which can be expedited.

- coordinate and expedite all requests for funding and technical assistance which are part of the comprehensive economic adjustment program.

Prepared by the
Office of Economic Adjustment
February 19, 1980

MX ECONOMIC ADJUSTMENT PROGRAM

POSSIBLE INTERGOVERNMENTAL ORGANIZATION



**Definitions:** FCRC = Four Corners Regional Commission Representative
FRC = Federal Regional Council Representative
OEA = Office of Economic Adjustment Representative
USAF = U.S. Air Force Representative
County = Multi-county Representative
State = MX Coordinator

With regard to the initial organization and planning discussed in the framework, the States of Nevada and Utah have been provided $1 million of FY 1980 DoD funds for these activities and a request for approximately $3 million of additional funds is under consideration for FY 1982. Additionally, OEA has initiated studies in each state which will produce preliminary economic adjustment plans. The scope of work for these studies was developed by representatives of the states and their potentially affected counties. Basically, the studies will describe the present socio-economic characteristics of the potentially-affected areas, provide general estimates of the possible MX community impacts for alternative basing locations (to the extent Air Force data is available), assess the areas development strengths and weaknesses and provide initial recommendations for steps needed to enhance organizational, planning and infrastructure capacity. These preliminary economic adjustment plans are scheduled for completion at the end of this summer.

Once the specific locations and configurations of the MX system are known, it will be possible to conduct detailed planning and fiscal impact analyses to determine the precise community infrastructure and service needs with related funding requirements and sources of funds. OEA and the Air Force are already working with the states and counties to devise a joint approach to this detailed planning phase.

c. When would the final, comprehensive adjustment assistance plan be completed? Based on the present MX construction schedule, wouldn't the comprehensive plan be implemented well after the impact of construction workers and their dependents and other impacts are already under way?

Answer: Local-state-federal working groups are being established in both states to assure full integration of planning efforts for MX construction activities, MX base design and community impact mitigation. This should assure that community economic adjustment activities can take place in consonance with MX construction activities.

## LAND WITHDRAWAL LEGISLATION

Question: Is it true that the proposal to fast track the acquisition and construction of the basing mode has been shelved for the time being? Why? Will the Air Force be able to meet the initial operational capability (IOC) without fast track legislation? Under what circumstances would you recommend proceeding with a request for fast track legislation?

Answer: The Air Force prepared draft legislation designed to reduce the procedural time required to obtain land withdrawal and environmental clearances. The Air Force has worked closely with BLM to establish procedures for processing land withdrawals and now believes that M-X requirements and schedules can be met without legislation. A clear indication of a risk to the IOC would cause this type of legislation to be reconsidered.

Question: Have you made any provisions for options, such as fast-track legislation, which would be activated in the event that development of the MX is interrupted by litigation, claiming for example that the EIS is invalid?

Answer: The Air Force does not believe that special legislation is warranted at this time. Responses to litigation will be evaluated when and if it happens.

## EIS ANALYSIS AND EVALUATION

Question: As you know, Governor Matheson sent a letter to B/G Forrest McCartney, Vice Commander, Ballistic Missile Office, USAF, on February 29, 1980, concerning Utah's position on the next environmental impact statement. He noted that the EIS must be comprehensive and detailed, and concluded, "In a matter of this magnitude, the EIS must inspire confidence that a thorough and professional job of analysis has been performed since there are many potential initiators of legal challenges to this EIS, including the State of Utah." In the Air Force's view, what actions would meet the conditions that the Governor has set forth? It would seem to me to be difficult to meet the requirement for a comprehensive EIS while at the same time avoiding the inclusion of information that might be of use to the Soviets in attacking the racetrack system. Is that a problem, and if so, how are you coping with it?

Answer: Several actions help inspire confidence that the EIS is thorough and professional. The key has been to be open and forthright with the Governor's staff and to encourage public participation in the EIS process.

Earlier this year, we conducted scoping meetings with Congressional delegations, federal, state and local officials, and with the general public. Significant issues were identified which will be addressed in the Draft Environmental Impact Statement (DEIS), scheduled for release in July 1980. We have been working with state officials and other interested agencies to provide interim status reports and other requested information during the preparation of the DEIS. These working sessions have given the states considerable insight to the content of the DEIS and will help make it a better document.

This summer, after the DEIS is filed with EPA, the public will be able to thoroughly review the DEIS to insure it has adequately addressed their concerns. Public hearings that are scheduled will provide another forum to address citizens concerns and to build confidence in the DEIS. Significant written and oral comments will be considered for incorporation into the final EIS.

As you will note from the foregoing comments, there are many opportunities for groups and individuals to participate throughout the EIS process. Once the DEIS is published, it will undergo the most intense scrutiny imaginable. We expect comments from all levels of government, groups and individuals. The general tone of those comments will help reflect public assessment of the DEIS adequacy. We have been working closely with BLM and state officials and expect the DEIS to be a good document. The proof of this will be during the public review period following publication of the DEIS.

Regarding the value of the EIS to Soviet planners, we believe that no beneficial information will be disclosed that would contribute to a successful attack against M-X. The EIS is going to be unclassified and will be carefully edited to insure sensitive information of this nature is not included in the document. Exclusion of such sensitive information will, in no way, diminish the public's opportunity to assess the environmental consequences of the program.

## EIS SCHEDULE

Question: With regard to the accelerated schedule for EIS completion -- is July 15 still the date for completion of the draft EIS? Does the 3-month comment period remain unchanged?

Answer: 15 July 1980 remains as our approximate date for draft EIS completion. With regard to the comment period, the Council on Environmental Quality's guidelines state that a 45 day comment period is appropriate for draft EIS comments, extendable to 60 days. The Air Force will abide by these guidelines, and possibly allow for additional comment time depending upon the impact to the program schedule.

## M-X BASE HOUSING

Question: In a project of this magnitude, perhaps the most complex issue having to do with socio-economic impact is housing and support services for the in-migrating construction workers and military and civilian personnel and their dependents. Has the administration taken a decision as to whether base personnel will be housed entirely on the base itself? Is the administration willing to consider ways to prevent the destabilizing effect of speculation on private land which will certainly occur once a base-siting decision is made -- perhaps by obtaining public lands to be released for housing development associated with M-X development? Shouldn't availability of public land for this purpose be a criterion for selecting the base-site?

Answer: We have not decided whether base personnel will be housed entirely on the base itself. This decision will depend on the chosen base location and will be influenced by the capacity of the community to provide off-base housing. We are maintaining maximum flexibility in this regard by studying a wide range of on-base versus off-base housing alternatives. Additionally, we anticipate a phased approach wherein the on-base housing could be constructed in groups or blocks. There would be periodic decision points to determine if the next increment should be constructed or if off base housing should be used.

Virtually all of the suitable land for M-X in Nevada/Utah is public land; therefore, we do not expect a big land speculation problem there. There is a potential problem with some of the candidate base locations in that they do not have land for expansion. The Air Force is working with the Department of Interior to resolve this potential problem. We are aware that these "land-locked" communities will require special attention; therefore, this is an important factor in selecting candidate basing areas.

## EXPLORATION IN DEPLOYMENT AREA

Question: What will happen to seismic exploration for minerals, oil and natural gas in the areas where M-X is deployed--will such exploration be prohibited altogether?

Answer: Such exploration will continue. We will utilize point security, withdrawing about 2 1/2 acres around each horizontal shelter just as we do in the presently deployed Minuteman sites. These small areas will be about a mile apart, and the land between them will be open to the public as it is today. Grazing, mining, recreation, etc., will continue. Knowledge of the location of natural resources will be greatly expanded due to M-X construction and deployment, and this data will be made available to the public. Our commitment, as well as the President's, is to encourage and protect existing and potential co-use of the deployment areas.

## NUMBER OF PEOPLE

Question: With the recent decisions to use the grid or linear road system and to set-up Bechtel-like camps for construction workers, what are the new figures for the number of people expected to come into Nevada-Utah due to M-X deployment.

Answer: We are currently conducting extensive analysis of the numbers of people that will move to the deployment area. This data will be published in mid-summer in the Draft Environmental Impact Statement and made available to the committee and the public at that time.

## URBAN INSTITUTE STUDY

Question: Regarding the Kitsap County defense impact experience --the record of the November 1979 field hearings indicates that a study was contracted for by OEA with the Urban Institute to review the initial projections of impact and assistance requirements for the Trident project and compare them with actual experience. The study was also to have recommended improvements in the process of impact mitigation assistance. This study was scheduled for completion in the first quarter of 1980. Do you have any results from that study which would be beneficial in MX impact planning? If not, please submit the results of that research for the record at a later date.

Answer: Urban Institute's research is in its final phase and should be available in August. We are confident that their findings will be most beneficial to MX impacted communities. We will be more than happy to provide you with the full results of Urban Institute's work when it is completed.

## ADDITIONAL MATERIAL

Senator **Laxalt**. Senator Garn has submitted some additional material to be inserted in the record. It will appear at this point.

[The material follows:]

## ADDITIONAL INFORMATION SUBMITTED BY SENATOR GARN

## IMPROVING COMMUNITY ASSISTANCE PROGRAMS IN DEFENSE GROWTH IMPACT SITUATIONS

### Introduction

In an effort to mitigate the community impact of establishing a new defense installation, the Congress on two occasions enacted special legislation. These laws authorized the DoD to assist communities located near the Safeguard complex and the Trident base in "meeting the costs of providing the necessary municipal facilities and services". The legislative language was identical and the procedures developed to carry out the law were identical. In the event the Congress should deem it necessary to pass legislation which would provide assistance to the communities impacted by the MX, this paper provides recommendations for improvements to the previous laws and administrative procedures.

In late 1979, representatives from the States of Nevada and Utah met with federal, state and local officials from the Kitsap County area, the site of the Trident submarine base. The purpose of this visit was to obtain guidance from a community which has been attempting to manage rapid Defense-related growth since 1974. While community leaders from Nevada and Utah found the visit to be very helpful, they came away with two concerns.

The first concern about the Trident experience is that funds were not available to meet the costs of operating expenses, with the exception of some minor assistance for law enforce- ment personnel. Secondly, the established procedures for funding capital facilities, i.e., the existing federal channels, were unnecessarily time consuming. In response to the first concern, the paper provides some general guidance about a legislative provision which could permit an equitable payment for services. With regard to the second, the legislative and procedural changes proposed herein would reduce, by about 60 percent, the time it takes to process a request under the system established for the Trident program, while using existing federal channels.

### Legislative Intent

The purpose of the Safeguard and Trident Community impact assistance legislation was to preserve the existing quality of life in the impacted communities by providing resources to help them adjust to the impacts of sudden growth in defense activity. Specifically, it was intended that the necessary community facilities be constructed and services provided in a timely manner to accommodate the growth thereby, preventing congested highways, overcrowded classrooms, deteriora- tion of services, etc. Congress legislated that if an unfair, and excessive financial burden was incurred by the community, that DoD dollars would be appropriated to meet those costs which were DoD related. However, it was not intended that DoD alone fund the growth as indicated by the provision that resources could be provided only if they were not available from the domestic agencies. Lastly, the law required that the grant assistance be administered through existing federal programs thereby removing DoD from a responsibility which rightly belongs to the domestic agencies.

## Deficiencies in Previous Programs

The experience of the Safeguard and Trident Community Impact Assistance Programs indicates that some community applications for DoD assistance took upwards of nine months for approval and funding through the federal agencies. Several factors contributed to the delays, all of which are addressed in the sections on legislative and management improvements.

While Sections 610 and 608 (Safeguard and Trident, respectively) provided for payments for services, the general interpretation of the Congressional Committees which reviewed the community impact assistance requests was that the money should be used for capital projects. Consequently, payments for services were a minimal part of the programs. In the case of Trident, local leaders claim that there is a shortage of operating funds as a result of the population growth; in particular, funds for adequate police protection. (The shortage of operating funds was attributable also to the Washington State six percent annual increase "cap" on existing real estate taxes.)

Since DoD was providing financial resources, there appeared to be some complacency on the part of the domestic agencies with regard to their responsibility to fund projects. An analysis is currently underway to determine if this observation is accurate. In any event, the legal requirement to certify that funds were unavailable from the domestic agencies created significant delays in processing applications.

## Legislative Improvements

### A. Expediting Fund Transfers for Capital Projects

1. Elimination of Existing Requirements. Sections 610 and 608 contained five basic criteria. They were as follow:

a. The request had to qualify under an existing federal program.

b. There had to be an "immediate and substantial need" for the proposed project.

c. The requirement had to be the result of Safeguard/Trident.

d. The requirement had to create an "unfair and excessive burden" on the local community.

e. Funds had to be unavailable for local or federal shares.

It is recommended that the first four criteria be included in new legislation but that the fifth be eliminated in order to expedite the funding process. The first criterion is critical since the expertise for reviewing and monitoring grant-in-aid programs exists in the domestic agencies and Congress will wish to rely on it. DoD does not have this expertise and to build such capacity would impose unnecessary delays in establishing a responsive program. Criteria b thru d are essential to insure that the interests of the federal government are protected. It is anticipated that a fiscal impact analysis will serve as the documentation for meeting these three criteria.

With regard to the elimination of criterion e, the experience of Trident has shown that contributions from other federal agencies cannot be relied upon. Several months were required for agencies to provide certification that funds were unavailable and DoD could not process the requests until that certification was received. If it is assumed that resources will not be available from the federal agencies for "608" type projects, applications for funds can be submitted simultaneously to DoD and the appropriate federal agency. DoD will review the request for compliance with criteria b thru d while the federal agency reviews it for compliance with criterion a. By removing this provision, it is not intended that the domestic agencies are freed of their responsibility to provide financial assistance. Rather, it is intended to anticipate the actual situation so that the transfer of funds can be expedited. Since the fiscal impact analysis will identify the local financial deficit, it serves no purpose to require certification that funds are not available at the local level.

2. Appropriation Level Transfers: The Safeguard and Trident programs were interpreted to require the transfer of funds at the departmental appropriation level -- involving a Standard Form 1151 appropriation transfer through Treasury to the appropriate domestic agency. This process normally involved a three-month delay. A far more effective approach would be to ensure that the authorizing legislation permits an inter-agency transfer (Standard Form 1080) directly from DoD to the domestic agency without the "appropriation level" juggling through Treasury. This generally involves a 2-3 day transaction period. It would entail only a minor amendment emphasizing "direct transfers" to eliminate any ambiguity.

3. Federal Agency Overhead Expenses: Only one of the domestic agencies attempted to impose an administrative surcharge (five percent) on Trident applications; these charges were the standard for Safeguard applications and projects were substantially delayed as a result. The authorizing language for new community impact assistance should preclude such overhead levies -- "not withstanding any other provision of law".

### B. General Provisions for Capital Projects

In addition to reducing time through the above proposals, the following recommendations are submitted with the intent of developing legislation and establishing a program that will insure the authority for a comprehensive and responsive program.

1. Anticipated Community Impacts: The Safeguard and Trident legislative language requires the Secretary of Defense to use existing federal agency program authorities, which in a very few cases (such as P.L. 81-815) permited the anticipation of likely impacts. This problem was corrected for Trident schools through an amendment to the basic HEW authorization in P.L. 94-94. The problem should be corrected by a clause related to anticipation of impacts.

2. Federal Loan Guarantees: The impact area will secure a long term stream of increased revenues from the program. The first demand on these additional revenues should be to meet increased operating costs. To the extent that operating costs for improved municipal services can be satisfied, the additional proceeds should be used for some portion of the debt service. However, most states have limitations on municipal indebtedness as a percentage of real estate appraisals or current revenues. It is important that some form of Federal loan guarantee be established which will permit indebtedness to be calculated over and above state ceilings. An example which supports this argument can be found in the case of the Safeguard complex in Langdon, North Dakota.

When the basing program was abruptly discontinued, OEA made arrangements to reimburse that portion of municipal indebtedness related to future earnings from the curtailed ABM program.

3. Capital Requirements Against Future Earnings: Some mechanism also should be established for federal payment of indebtedness until the community revenue flow is adequate to meet all oeprating expenses -- it may be several years into the operational phase. Based on a comprehensive fiscal analysis, it may be desirable to defer local-state indebtedness early in the program when the community will have sufficient earnings in later years to meet normal indebtedness service.

4. Initial Capitalization of Sewer and Water Systems: Municipal water and sewer systems function as separate revenue-financed programs with availability charges to finance improvements and service charges to finance operating costs. There is a need, however, to provide the initial investment in new systems before the arrival of the MX workforce. New legislation should include a provision which permits initial capitalization of the systems in advance of the arrival of the M-X personnel.

C. Provision for Operating Costs

Since the laws authorizing federal payments to state and local governments for operating costs are few in number, it seems apparent that the Congress intends that this is the responsibility of the state and local governments. In the Trident program, approximately $1.3M was provided in three increments for salaries of law enforcement personnel which was an issue of great controversary among Congressional members. However, given the magnitude of the potential impact of the MX, undoubtedly start-up O&M costs will be required until sufficient federal grants (e.g. schools impact assistance) are earned or until local revenues are generated (e.g. real property taxes, sales taxes, etc.). The legislative language should take into account that an accurate MX-related operating deficit is difficult to determine and that only estiamtes can be obtained through a fiscal impact analysis. Therefore, caution should prevail so as not to involve the Department in an open-end commitment to paying for services. Additionally, sound and reasonable policies and procedures should be implemented to protect DoD and to convince Congress of the need and merit for this deviation from existing laws.

Management Improvements

- Architectural Costs: Architectural and design costs are generally funded as an element in the project cost. A general allocation of architectural and design resources should be made to the local MX coordination office. At the time that local applications are initiated for brick-and-mortar construction, the coordination office should be authorized to initiate the design work from the general allocation fund. When the brick-and-mortar application is approved, the design costs can be charged to the project and can then be refunded to the general design fund. Thus, project design can be accomplished while the applications are in process for approval and lead-time is minimized.
- Clear Identification of MX Applications: As a simple administrative step, community impact assistance applications should be clearly identified with a separate application coversheet similar to the approach

used by general Economic Adjustment Committee (EAC) applications. The coversheet should be sufficiently bright so that MX applications are not lost in a stack of normal applications.

- Projected-Related Nature of the Application: A clear decision should be made concerning the MX-relatedness of the application by an intergovernmental MX working group before the application formally enters the federal grants system.

- Advanced Funding: In the case of highway projects funded through the Federal Highway Administration (managed through the Military Transportation Management Command), it might be necessary to provide for an initial fund transfer to permit the early initiation of projects and the processing of change orders.

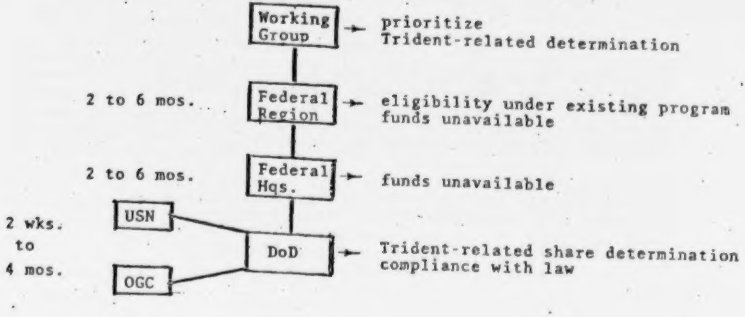
- Application Processing Office: The Safeguard community impact program had a small six-man office in Washington to process the applications within the federal agencies. In establishing the Trident office, the Navy did not provide the necessary billets for rapid processing of the grant applications, the preparation of the review and determinations, and the transfer and control of community impact funding. As a result, this additional burden fell to OEA at the same time the heavy base closure workload of the 1974-76 period was occurring. For the MX program, grant processing would be expedited considerably if the Air Force would establish a small grant processing office in Washington with immediate access to Secretary of the Air Force (Manpower, Reserve Affairs and Installations) and OEA. This office could be a field agency attached to Bolling AFB for administrative purposes, but it must be located in close proximity to the Pentagon. This one organizational step itself can save upwards of four to six weeks in the processing of funding requests.

Summary:

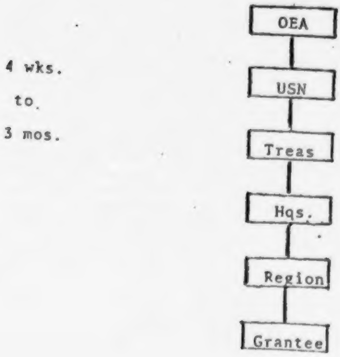
If the above recommendations are incorporated into legislation and program procedures, community requests for funds should be processed and approved within two to four months. The fund transfer should take from three to six weeks. See attached charts for the application process of the existing and the recommended system.

All of the recommendations contained in this paper are designed to streamline and/or improve the federal response to community impact assistance requirements. However, similar improvements are required at the state and local levels. In particular, local leaders with the cooperation of federal representatives should devise procedures that will increase the rate of individual project expenditures. In the case of Trident, semi-annual community assistance funding reports continuously showed local expenditures lagging fund transfers by more than 50 percent. Obligation rates usually lagged by about 25 percent. Members of Congress have been extremely critical of these delays. These and related problems should be addressed by the MX working groups before a community impact assistance program gets underway.

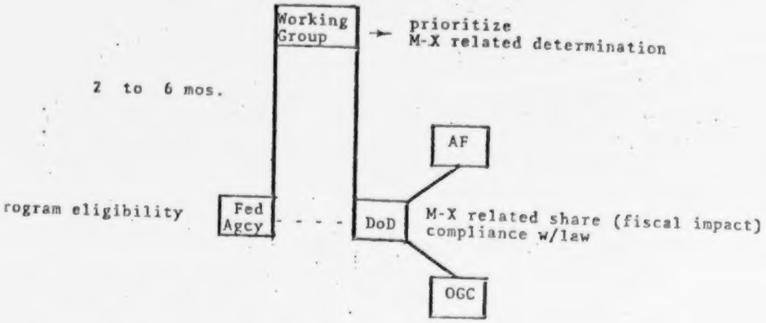
Existing System



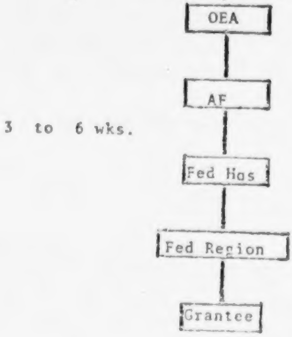
Fund Transfer



Recommended System



Fund Transfer



# SOME THOUGHTS FOR LOCAL GOVERNMENT IN UTAH IN ANTICIPATION OF THE POSSIBLE DEVELOPMENT OF MX

## Introduction

This paper is intended as my thoughts on the activities that would be most useful to local governments in Utah in preparing themselves for the possible growth impacts of MX. It is not intended as a cookbook of precisely what needs to be done, but more of a general direction of where one's time and efforts should be placed.

There are five major activities which need to be undertaken, and they should be undertaken in the following order:

1. Developing coordination mechanisms among local governments and between local, state and federal governments.
2. Preparing a response on the Air Force's Environmental Impact Statement.
3. Demographic baseline studies to define what now exists in the way of services and facilities.
4. Community plans for each local community in southern Utah.
5. A fiscal impact report listing out the cost of absorbing MX in Utah.

## Coordination Mechanisms

Of these five activities, the first and most important is developing the coordination mechanisms among local governments. This, although it may not appear to be so right now, is the easiest of all five. Without the coordination mechanisms, all future activities are severely weakened and almost useless. With strong coordination mechanisms, local governments have a strong political position, both with the state and with the federal government, are able to attract more competent technicians, can develop better community plans and write a single fiscal impact report which will bring in federal dollars as well as private investments.

The idea coming out of the April 12th meeting in Cedar City that there would be an Executive Committee made up of four local government representatives, three from the state and three feds to run the coordination for Utah MX impacts is a major step. You may want to suggest having one Air Force representative for obvious reasons, one Office of Economic Adjustment representative since they are one of the few advocates for local government in Washington, D.C., and one representative from the Federal Regional Council. If you can find the right person, the FRC could help cut through the inevitable red tape. The committee should be identified as the sole committee in Utah working on MX issues. Everything should go through them, and any other work done should be done as a subcommittee to that particular committee. All major policy decisions should be made only by that committee.

It is important that the federal government have only one group to deal with in the state, and they be kept out of any internal squabbles. The feds should not be in a position of mediating between one community and another or between local government and the state government. Your ultimate audience should be the Congressional committees that will be deciding whether MX will be built, what it will look like, and if it is built how much money local governments will receive to deal with it. As soon as possible, you should propose to the feds what you see is the problem and how you feel it should be dealt with, and what they can do to assist you, rather than the other way around.

If the Executive Committee can be recognized as the heart of all impact mitigation efforts, it will be difficult for the feds not to abide by the decisions made by that committee. In short, there is so much to do in the way of policy determinations, identifying costs, doing technical studies and managing growth impacts that you really don't have time to engage in political battles or intercommunity rivalries.

It is easier said than done, but the best way to treat dissident voices is to cut them out of the action. In other words, if there is a community that does not want to participate in this Executive Committee and would rather establish direct relationships with the Governor or the feds, the Governor, the feds, and the Congressional delegation should refuse to deal with them directly. The word must go out that all decisions made on MX impact go through that Executive Committee.

## Environmental Impact Statement

The least important of the five activities, but the one that will probably get the most press, is your response to the Air Force's Environmental Impact Statement. It is important that the response be as thorough as possible, only because this may be your last chance to get accurate data from the Air Force. Getting accurate data will be helpful in developing your community plans and in doing the fiscal impact report, but other than that, the EIS will fill up shelves in city halls and county court houses and have no long range useful purpose.

## Base Line Study

There are any number of groups who can assist you in doing baseline studies. The only concern that I would have is to not get carried away, and don't hire a major consulting group to provide you with a computerized baseline study. You don't need anything elaborate. What is needed is a quick study which would give you a general assessment of what the demographics of the area are, and some facts and figures for future reference and future studies. The best way to handle it, and cheapest, is to utilize college students under direction of one of your staff people, or you may want to hire a consulting group on a short term, relatively cheap contract. The major purpose of the baseline study is to provide data for the future fiscal impact study which will identify how much money you will probably be able to get from Congress. However, whatever is not completed in the baseline study can be done in the fiscal impact study, so it's not important that the waterfront be covered (or I should say the desert blanketed).

The critical item with the baseline study is that the data be uniform. It should be done by only one individual, or one group of individuals with clear policy direction. Each community cannot go out and do its own baseline study. That simply will not work, and it will cause havoc in doing the fiscal impact study later on. Therefore, it may help to have one contract or have the state take the lead, but one group has to do the baseline study.

At a minimum, a baseline study should include much of the following items:

> Population, including residential trends over the last few years; age groups; any particular unique social characteristics such as religious affiliation, racial make-up, high incidences of elderly or a high rate of Indian population in an area, anything unique should be identified at this stage.
>
> A cost break-down in each community should be done of tax rates, water rates, sewer rates, garbage disposal, assessed valuation, income levels, etc. (as complete as possible a social and economic profile of the community or geographic area). Other demographic characteristics would include household size, number of school kids, the number of schools, the age of the school facilities, the conditions if they are deteriorating, what plans exist even without MX for making improvements in the schools; a profile of the existent construction work force, particularly in terms of their salaries, characteristics, employment ranges. Hopefully, you can get a complete employment and unemployment picture by occupational area for all of southern Utah. Under the area of housing: the amount of available housing, vacancy rates, costs, both rental and purchase, any unique characteristics of the housing. Don't overlook general purpose governments: the number of employees, the salary ranges, number of buildings, how many permits are issued, the time it takes to process permits, etc. Other items should include transportation, since there will be money available to alleviate road problems caused by MX; identify what the transportation patterns are now, the amount of money spent on new construction as well as repair. Traffic counts are something that carry a lot of weight back in D.C. The bureaucrats love it, so any traffic counts you have (if you don't have a traffic counter, go out and buy half a dozen and spread them all over south Utah), you can use these statistics as pre-MX documentation. In the way of services: police, teachers, librarians, fire ratings, number of paid firemen, number of volunteers, response time to fires and to emergency medical runs, the capacity of the current fire services to handle hazardous materials which will be coming into the area. Include the number of acres for parks, the type of ball fields available, etc.

Again, this is something that can be done by many organizations, but it is important to keep in mind that the purpose of the baseline study is so that a few years from now one can go to a Congressional committee and say "this is the way it was, MX came in, and we want to make sure that you provide enough assistance to maintain that same level of service."

You must recognize now that MX is not going to solve non-MX problems. If you have impacts caused by IPP or other kinds of growth or if you have an existing situation in which services or facilities are deteriorated, Congress will insist they be solved locally. Also, be cautious of any offers by the Air Force to conduct baseline studies for you. A lot of information will be available in the EIS. Use that information carefully, and double check it. One of the most important aspects of having a solid baseline study is that in future years when you're applying for federal assistance, you can use your facts and figures to overwhelm any bureaucrat who's not sympathetic to your situation. The law of bureaucratic behavior will require them to respond favorably to your request as long as you have more data than they do. A baseline study is not a definitive explanation of every characteristic of social and economic activities in southern Utah, but more of a Chamber of Commerce piece for bureaucrats.

## Community Plans

Once the coordinative mechanisms are established and a technical team is organized to do the baseline studies, then local elected officials should concentrate on developing community plans. This can be done even prior to the review of the Air Force EIS. These plans should be done in each community and each jurisdictional area where there is a general purpose government. The state role should be extremely limited and preferably there should be no state role at all. There are two audiences of the community plan. First are the local citizens. This is the plan which will dictate what their community will look like in the next 10 to 50 years. The second audience is Congress. As stated earlier, MX community impact assistance will not alleviate all the problems in southern Utah. Therefore these community plans must be politically sensitive. The emphasis must be on simply accomodating the MX growth and doing nothing in addition to that, or if there are other amenities added to the community, they be paid for totally out of local resources.

Community plans need not be extremely detailed. Rather, they should be a philosophy statement in terms of the type of growth to occur in the community. There may be a disadvantage to having it so detailed and so technical that many of the local residents feel the plan was being designed by technicians or new-comers. Therefore, it is absolutely essential that local elected officials have full control over both the general purpose and concepts of the plan as well as the specific items within the plan.

Given the fact that there is very little data available now from the Air Force regarding the numbers and location of impact, it may be best to have the community plans drawn up at this time on a staged approach, so it is flexible and can handle both large and small impacts as well as short-term construction and long-term operational impacts. The advantage of doing a staged approach is that even if MX is not built, there will still be a useful community plan in case there is other growth either in minerals and mining or energy.

An important note is that even if the Air Force builds a totally self-sufficient base near a community, it is likely that residents of the existing community will take jobs on the base. They will maintain their residence in its current location, but new residents will have to come in to take the jobs that the current residents left. Therefore, even though the new jobs will occur on base, new residents will be permanently moving into your community.

The community plan itself should include at a minimum:

a general philosophy statement, land use plans which would identify the mix of densities for residential areas, (will all multifamily units be clustered together, or will they be scattered throughout all residential areas? Will the commercial and industrial activities be concentrated in one area? Do you prefer small neighborhood shopping or just one large regional center?) Under the land use plans, there must be explicit identification of what controls and enforcement mechanisms will be in place. A general capital improvement program which identifies the current cost of utilities and how funds will be raised to expand those utilities or build new utilities such as sewer and water systems, is helpful, but a full capital facility plan deciding how large a sewer system, how many miles of road, where, etc., should be left for the fiscal impact report. By the time that report is under way, more site location data should be available from the Air Force. At this stage, the community plans should really concentrate on being a philosophical piece.

## Fiscal Impact Report

The final item, and the one that is most critical in trying to gain mitigation dollars from Congress, is the fiscal impact report. Simply speaking, the fiscal impact report will identify the gap between what it will cost local residents to expand their capital facilities, and extra costs in terms of operating those facilities, and the revenue that will be brought in by new residents and commercial activities because of MX. It is absolutely essential that the fiscal impact report stand on its own as a creidble document. Congress will look very skeptically at that report. Any request for assistance will be screened not only by the Congressional committees and their staffs, but also by the Air Force, the Office of Economic Adjustment, and probably dozens of federal domestic agencies. The Executive Committee must play a key role in reviewing all aspects of the fiscal impact report to insure that the deficits identified are in fact valid. A misleading request for funds or a request for funds on a questionable project, even though it may be accurate, could cause enough damage to affect many other projects. If a member of the Congressional staff questions any one statistic in the fiscal impact report and proves that the assumption is overstated in favor of the local governments, very likely the whole report will be called into question, and much, if not all, of the mitigation dollars will be down the drain.

While local elected officials can oversee their portion of the fiscal impact report and separate sections could be done by each community and county, ultimately they should all be brought together into one fiscal impact report submitted by the Executive Committee or, perhaps, by the Governor. This report should not start until all other reports mentioned above are completed.

In retrospect, if we were doing it again in Kitsap County, I would have had more federal domestic agency participation in the fiscal impact report. I think ultimately this would have increased their understanding of problems in Kitsap County and perhaps gained a few more allies for alleviating those problems. Federal domestic agency participation can be more helpful at this stage than any other time.

The feds can assist in identifying where new ideas can be put into place, what the true costs of a particular project would be, and identify ways of cutting back on the time delays of getting the construction project begun and concluded. I still feel, however, that in the grant application process, the role of the federal agencies can be cut back, but it should not be cut out of this particular facet.

As with community plans, the fiscal impact report must be politically sensitive. The sole audience of the fiscal impact report is the Congressional committees which will be appropriating funds. Any impacts that are not directly caused by MX should be separated out and identified.

The actual procedures for conducting the fiscal impact report are far too technical to be covered in this brief paper. I will throw out just a few points for consideration.

1. The report must be done with the help of a contractor, someone who has conducted at least one fiscal impact report. Do not try to undertake it yourself or with a consultant who has not also done a very detailed fiscal impact report. It will only hurt your case in front of Congress.

2. You must take into consideration the revenue lag, that is, the period of time between when the new residents will be coming into the community demanding increased services, and when they will be purchasing land, having that land appraised, and taxes being paid. There is normally at least a 12-18 month lag in most growth situations.

3. The report must identify utility costs that now exist, and include a capital facilities plan which recognizes the need to increase utility rates. Increasing rates should be undertaken as soon as possible since capital reserves are rarely accumulated for water and sewer in anticipation of rapid growth. Recognizing that this is unfair to the current residents, it will help build your case in Congress and also make them appreciate the reality that MX will raise local taxes and reduce levels of service.

4. Carefully separate out those impacts which will be felt most at the local level as opposed to those which will be felt at the state level. An example is schools, which, since it is principally a full state funded system, the impact in school construction will be felt statewide. This will reduce the impacts locally since it will be absorbed on a statewide basis. Though the dollar impact is just as great, it is a problem for the state to handle and should be identified as a state problem. Other impacts such as the need to expand local jails is obviously a local problem.

5. A historical analysis of bonding activity and the bonding capacity of local governments should be indlucded. In all likelihood, Congress will be much more inclined to provide long term loan guarantees and write downs on local government bonding capacity than they will for outright grants. Though it is important to remember that MX growth will never pay for itself, expenses will always exceed revenues.

An analysis should be done as soon as possible, and it could be separate from the fiscal impact report, of local and state laws that limit flexibility in your revenue sources. You may need to have some waivers in state laws that will allow greater flexibility at the local level to tax new residents or new commercial activities or, for example, a development tax or a realtor tax which would zero in on the boom that is bound to occur in that sector. There may be a tendency on the part of some local business men to overestimate the revenues that will be generated by MX. There may be an anticipation that a lot of the Air Force contracts for building roads, laying pipes, etc., will be awarded to local contractors. In all likelihood, that will never happen. The Air Force must, by law, award competitive bid or contracts to the lowest bidder. There is no local preference written into national law. Therefore, when the Air Force awards contracts, they will package them as large bids to cut down on their contract paperwork. Those large bids will be eaten up by large contractors nationwide who will probably bid very low on the initial projects so that they can get a foot in the door and get a base of operation in southern Utah. Once they're there, it will be virtually impossible for a small contractor to bid directly on an Air Force job and expect to receive that award over a national contractor. Obviously, there will be some spin-off in sub-contracts, but history has shown that those economic boons of working directly on a major project like this are often overestimated and never pan out for local contractors. Local revenues are less than anticipated.

# Bill Moyers' Journal

## "The MX Missile Debate"

Executive Producer ........................ JOAN KONNER
Executive Editor ........................... BILL MOYERS
Producer ................................. SHEP MORGAN

Funding for this program is provided by this station and other Public Television Stations and by grants from the Corporation for Public Broadcasting, the Ford Foundation, and Weyerhaeuser Company.

A coproduction of WNET and KUED PBS Air Date: April 24, 1980

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**BILL MOYERS' JOURNAL** Air Date: April 24, 1980

## MX Missile Debate

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[*Tease — aerial views of Salt Lake City, it surroundings, and the Great Basin*]

**BILL MOYERS** [*voice-over*]: This is Salt Lake City. It borders the eastern edge of the great basin. Thousands of square miles of desert where the air force is planning to locate the MX, perhaps the most expensive weapon system ever built. The people of Salt Lake have mixed feelings about the deployment of MX in their state.

**WOMAN:** I don't think there's any necessity for this type of weapon at all. And I think that we're just discussing the end of the world when we're discussing weapons like that.

**WOMAN:** Industry and the population goes and stuff that it would involve would be worthwhile. I wouldn't mind seeing it come. If we're going to get blown up for one thing we might as well get blown up for having the MX missile.

**MAN:** The more I hear about it, the less I am attracted to it.

**WOMAN:** Well, I think it's probably something that we all have to have whether we want it or not.

**MAN:** I'm against it from an environmental standpoint. I think it's going to ruin our great basin out there.

**MAN:** It puts an awful burden on someone wherever it's located.

**MAN:** I'm in favor of the MX simply because I think it would be the greatest deterrent to nuclear war.

**MAN:** There's a need for it, but I think they're building it in the wrong place.

**MOYERS:** Tonight, here in Salt Lake City, we're going to be hearing a lot about the MX and the arms race in a special live debate from Symphony Hall.

**ANNOUNCER:** Live from Symphony Hall in Salt Lake City a special edition of Bill Moyer's Journal, The MX Debate.

[*Bill Moyers' Journal opening*]

**MOYERS** [*at the podium*]: I'm Bill Moyers. We're here to consider the MX. The development of this huge land based missile system will have consequences for us all. It will affect the strategic balance of power, the arms race, our relations with the Soviet Union and our allies, our defense budget, and thus, our taxes, and our economy. The people it will affect most immediately live here in Utah and in neighboring Nevada, for the Air Force proposes to use large areas of both states as prime locations for two hundred MX bases. There are many questions about what that would mean to the people who live here. And to deal with some of those questions the state of Utah has organized this public forum. In the audience are both Governor Scott Matheson of Utah and Governor Robert List of Nevada. And we're pleased to welcome them, the people who have gathered in Symphony Hall, and all of you across America to this consideration of MX. We'll hear from representatives of the administration, the department of defense, and the air force, as well as experts ranging from a nuclear physicist to a sociologist. And we'll hear from citizens of Utah and Nevada who, if the project continues, will be living with the MX. Our discussion and the question and answer session that will follow will deal with three main questions. Do we need the MX? How should the MX be deployed and based? And finally, what would be the social, economic, and environmental impact of the MX? Before we begin the discussion this evening, we'd like to give you some background on our nation's strategic arms policy which leads to the first question, do we need the MX.

*[Film segment begins]*

**MOYERS** *[voice-over]*: When we talk about strategic arms we're talking about the most destructive force that man has ever known, enough power to destroy an enemy on a scale that was unimaginable thirty-five years ago. Only once in history has nuclear power been used in a war. We dropped the atomic bombs which destroyed Hiroshima and Nagasaki in 1945 and effectively forced the Japanese to surrender, ending World War II. We have never again used nuclear weapons against a military target. The Soviet Union has never used them. Yet for thirty years we and the Russians have assembled huge nuclear arsenals, monuments to the fundamental and seemingly irreconcilable distrust which lies between us. Our current nuclear arms policy is complex, a world of per-weights, payloads, and re-entry vehicles. But it grows out of a couple of simple basic assumptions, nuclear vulnerability makes us weak, nuclear strength is a deterrent. Deterrent means that if the Russians throw us a nuclear punch we can take it and throw back a counterpunch so deadly they'll wish they had never started a fight. Our strategic defense rests on what's called a triad. It gives us three ways to deliver that counterpunch— a triple threat of weapons. In the air B-52s; under-the-seas, Poseidon subs; and on land, Titan and Minuteman missiles. The triad is designed to survive. If one or more legs is crippled by enemy attack the others will still be able to launch a counter attack. If our subs were knocked out, the bombers and ICBMs could fight back. If both bombers and ICBMs were destroyed, the subs could retaliate. The current strength of the triad gives us a numerical advantage over the Russians in submarine missile war heads and bomber weapons, but a disadvantage in ICBMs. At least for the next decade our policy of deterrence is based on the fact that both the sea and air legs of the triad represent a force so formidable the Russians would not provoke it. For now, our Poseidon submarine fleet is believed to be invulnerable to surprise attack. The scheduled edition of new Trident subs and missiles during the 1980s will give our sea-based force increasing power and accuracy. The oldest of American strategic weapons, the B-52 bomber, will probably be outmoded in the 1990s. In the meantime, the B-52s have been continually upgraded, most recently, with the addition of cruise missiles to provide a flexible and highly mobile attack force. It is the vulnerability of our land base missiles, our ICBMs, which is in question. Currently, the giant Minutemen and Titans represent about thirty percent of American strategic forces. ICBMs, on the other hand, represent seventy percent of Russian nuclear attack force. The Soviets consider the land-based missile the centerpiece of their nuclear arsenal, and their development of it has been outpacing ours. Military strategists are concerned that the Russians have gained the ability to target their ICBMs with almost pinpoint accuracy to destroy American Minuteman and Titan missiles in their concrete silos. In military jargon, the survivability of our land based missiles is in doubt — in doubt because of this silo-busting Russian missile, the SS-18. It can deliver a multiple payload of ten to thirty nuclear warheads with a high degree of accuracy. What should we do about the Soviet capacity to destroy our missiles in their silos? The pentagon's answer was supplied by President Carter on September 7th, 1979. He announced full scale development of the MX, Missile Experimental, a major new land-based missile system.

**PRESIDENT CARTER** *[on film]*: The system is survivable, it's verifiable, it has a minimum impact on the environment, it's affordable in cost, and it's consistent with our SALT goal of deep reductions in strategic arms.

*[End of film segment — return to Symphony Hall debate]*

**MOYERS** *[at the podium]*: David Aaron, as a principal White House advisor to the president, the deputy assistant to the president for national security affairs, what does the White House see Russians up to in the world that warrants an MX?

**DAVID AARON:** Bill, I think that's one of the basic questions that has to be answered when you address the question of why an MX system. I think your introduction has made very clear that the basic responsibility of the United States government, indeed of the United States people, is to maintain a deterrent against nuclear war. That means maintaining a stable strategic balance, it means taking whatever actions may be necessary to preclude Soviet strategic nuclear superiority. But we have to look at what deterrence means. What it means is what the other guy thinks, what the Soviets calculate to be their risks, their opportunities and that's where your question comes in, because the people that we have to deter are the same people who a few months ago invaded a neighboring country, overthrew its government, arranged for its president to be murdered, and are presently engaged in killing hundreds and even thousands of Afghans who are fighting against the Soviet invasion. And they're also the same people who have spent over $100 billion on the new generation of ICBMs which have brought about a fundamental change in the strategic balance.

**MOYERS:** Does the White House believe that Soviet strategy includes the possibility one day of a first strike against the United States?

**AARON:** The question of a first strike has to be looked upon, it seems to me, in this way. The Soviets have payed $100 billion to acquire the capability to threaten our ICBMs. In our judgment, we must respond to that, because if we do not, we will undermine our alliances, because people will not have confidence that we're prepared to defend ourselves. It will undermine arms control because the Soviets will conclude that we will not take the steps necessary to defend ourselves and we will encourage the Soviets to try to make vulnerable the rest of our strategic deterrence.

**MOYERS:** So the White House does assume that within the Soviet strategy there is a presumption of the possibility of a first strike.

**AARON:** What you have to conclude about a first strike is that if they were willing to pay $100 billion to have that capability, we have to take the steps necessary to preclude the possibility that they might think there's an advantage in it for them.

**MOYERS:** Mr. John Lehman, you're a former member of the National Security Council and President Ford's deputy director of the Arms Control and Disarmament Agency. If the Soviets did attack our land missiles could we not deal them a devastating blow with the 7,000 warheads we would still have on bombers and submarines, and if that's so, does it really matter if one of the legs of our triad is weak?

**JOHN LEHMAN:** Well, Bill, there are two problems with that formulation. First, the capability in hand and recognized by both sides that the Soviets have an option that we do not have, which is to hope to remove the prompt counterforce retaliatory capability of the United States—

**MOYERS:** To hit our silos and our land-based missiles?

**LEHMAN:** —to hit our silos, leaving us with the remaining bomber force, which by the way is also quite vulnerable and would not have a high percentage of survivors in a surprise attack, and principally with the warheads, the 4,000 or so submarine launched warheads that we have, presuming they were not also caught in port, which is the normal configuration of about half of them, then the president would then be faced with the choice of either attacking with those retaliatory forces that are not directed, do not have the capability to bring the conflict to a close by hitting the remaining military capability of the other side, but you would have a mixture of counter-value SALT target weapons principally available to the president and he would have to launch a retaliation against the population centers of the Soviets in the full knowledge that they would not have had to expend under the current balance, even as much as fifty percent of their own hardened silos remaining which would guarantee—

**MOYERS:** So you don't—

**LEHMAN:** This would guarantee a second strike from the Soviets which would devastate our own population centers.

**MOYERS:** So you're saying that our submarines and our Air Force retaliatory power is insufficient without the other leg of the triad, without the land-based missiles being secure.

**LEHMAN:** I believe that's absolutely the case. There's a synergism in our triad. That means they depend one upon the other for the effectiveness to carry out a conflict scenario if that's required.

**MOYERS:** Herbert Scoville, you were once assistant director of the Arms Control and Disarmament Agency, formerly deputy director of research of the CIA, and now you're president of the Arms Control Association. All we spent on defense so far, did not prevent the United States from losing in Vietnam, it did not prevent Iran from seizing our hostages, it did not prevent, as David Aaron said, Russia from taking over Afghanistan. As you look at the world, aren't our more pressing needs to upgrade and strengthen our conventional forces instead of spending this much money on more nuclear deterrent?

**HERBERT SCOVILLE:** Well, they certainly are putting more money and hundreds of billions of dollars into the kind of thing we're talking about with the MX system. At this time it's a bad waste of our money because it does not improve our security and we can use that same amount of money on our conventional forces or in satisfying the social needs of our country.

**MOYERS:** Why do you say it does not improve our security, because the two speakers just before you assured us that it did.

**SCOVILLE:** Well, the reason it doesn't improve our security is because the MX system is designed to have the capability of threatening the Soviet deterrent force in a first strike. In other words, it is a potential first strike weapon.

**MOYERS:** The MX is a first strike?

**SCOVILLE:** That's right and furthermore it is no good at hitting Soviet silos, which it is designed to be able to do, if it is launched in a second strike. Because in a second strike, it would only be hitting an empty silo.

**MOYERS:** In other words, the Soviets would have thrown their missiles at us. [*applause*] The Soviets would have thrown their missiles at us and before they're hitting you— before they hit you, say we would have responded with the MX.

**SCOVILLE:** No, not before we hit, but any of our MX missiles that happen to be left over, and we retaliated against the Soviet force, the Soviets are certainly not going to leave their remaining missiles, the fifty percent that they didn't fire in their first strike, they're not going to let them sit in their silos while we destroy them. They're going to launch them the moment they get a sign of warning that we have launched our second strike. So firing counter-silo missiles in the second strike is the surest way to make sure that any residual Soviet missiles get fired at every target they can think of in the United States.

**MOYERS:** Well, if you're correct then the premise of the MX is that we would absorb a first strike and then hurl our MX back at them. What is your response, David Aaron, to that proposition? If two thousand Soviet missiles were coming at us or how many of them, do you think any president would sit there and wait?

**AARON:** Well, what we would like to do is to have the capability to not have to fire when we think our computers tell us we ought to fire. We would like to be able to have a deterrent that was secure enough so that we didn't have to launch upon warning or launch when the computers told us to do it. But I want to go back to something which Dr. Scoville said, because it's not correct.

**MOYERS:** All right.

**AARON:** The MX, as we have planned to deploy it, is not a first strike weapon, it will not give us a first strike to destroy the Soviet deterrent, it will not even give us the capability to destroy the Soviet ICBM force in the sense that they will not have anything left over in that force. So that whole concern, I think, is exaggerated. But I think it does underscore a very important point. Because what Dr. Scoville is saying is that if the Soviets begin to feel as vulnerable as we are, they're going to react. And I only hope that we're capable of reacting as well.

**MOYERS:** Dr. Scoville, do you agree with that, no you don't agree with that. We have two fundamental disagreements here. David Aaron of the White House says the MX is not a first strike weapon and Herbert Scoville, you assure us it is.

**SCOVILLE:** Well, I'm very glad to here David Aaron say that it's not a first strike weapon. And the president has also said that we have no intention of launching a first strike. But if you're a Soviet leader who has to think about his security just the same way that David Aaron and Harold Brown and the president have to worry about U.S. security, when you see a force being built up against you, which has two thousand warheads which have the accuracy so that each warhead can threaten a single Soviet ICBM silo, then they would sit there and worry that this would be a first strike threat against their ICBM force which is seventy percent of their total deterrent.

**MOYERS:** What do you think they would then do if they see this as a first strike?

**SCOVILLE:** One of the things they would do, and several of the things they would do, are very dangerous for our security. And that's just the reason that I'm saying the MX does not improve our security. The easiest thing for them to do, and the cheapest thing for them to do is to do just what you were talking about a moment ago, put their missiles on launch-on warning, so that—

**MOYERS:** Which means?

**SCOVILLE:** Which means they could be launched within the fifteen minutes it takes our warheads to go from the United States, or the fifteen or thirty minutes it takes our warheads to go from the Unites States to the Soviet Union.

**MOYERS:** That presumes we would strike first.

**SCOVILLE:** Well, they would do that as a hedge against the fact that we might strike first, if they were worrying about that. They would put them on this launch-on warning. Now the trouble with that is that then it depends on computers whether a nuclear weapon will be fired. And the last thing in the world we want is the Soviet Union to put their missiles on launch-on warning and in fact, increase the risk by several orders of magnitude that we'll all be involved in an accidental nuclear war because the computers failed.

**MOYERS:** John Lehman, you're shaking your head.

**LEHMAN:** That logic is really worthy of the Mad Hatter. I mean I haven't heard anything as ridiculous in years. [*applause*] You know— [*boos*]

**MOYERS:** This is not a popularity contest.

**LEHMAN:** For eleven years, since I came to Washington I've been sitting listening to Pete Scoville apologize and explain away what Russians have been doing. As the administration recently testified in that ten year period that Pete's been apologizing for them, they've spent $240 billion more than we have on defense. We could have bought the whole MX system, fifty attack submarines another twenty Trident boats, a thousand F-16s, a thousand F-18s. I'm sorry to steal your lines, Bill, but this is an enourmous disparity of effort over the last ten years and all through that Pete has opposed every single major system to redress this balance and apologize for and said that it is meaningless, every single new deployment that the Soviets put out.

**MOYERS:** But what evidence is there, John—

**LEHMAN:** --And I would really like to hear how you explain that dual standard, Pete.

**MOYERS:** But what evidence is there, John Lehman, that the Soviets intend to use this capacity they have for a first strike against which the MX is designed to defend us?

**LEHMAN:** Bill, that's a strawman argument. As Henry Kissinger recently wrote, I mean, never in the history of the world has a nation achieved a kind of nuclear and military preponderance across the board, and not translated into political and geopolitical gains. That has never happened. And the fact that they have this superiority and have built the capability to take our counterforce capability under attack, does not mean they plan to launch a pre-emptive attack, which I don't believe anybody in the Kremlin plans that. But they do know that this determines the geopolitical atmosphere in which decisions like Afghanistan and our decision on what to do in the Persian Gulf, are taken. And it sets a context in which it makes it much more difficult for us to defend Western interests then they to defend theirs.

**MOYERS:** Do you agree, David Aaron, that— [*applause and booing*] Do you agree that if we do not build the MX, we will be perceived by the Soviets as vulnerable?

**AARON:** Yes, I certainly do. I think that there's no question in my mind that the Soviets have invested a lot of money in this system, they have invested in the Command Control. And I just don't think that it's very prudent for any of us, when you really think about deterring a nuclear war and all the accidents of history and all the problems that can happen in the world, to depend upon the goodwill of the Soviet Union not to exercise an option that it has.

**MOYERS:** But do we want to spend $60 to $100 billion dealing with perceptions of vulnerability? Aren't there better ways of sending messages to the Soviets and to our allies? For example, you raised the question of Afghanistan and I think you mentioned Iran, shouldn't we have moved into the Persian Gulf with conventional forces, something that we could use, something that would confront them where they are and send the message that way instead of spending $60 to $100 billion dealing in the perceptions of vulnerability, which is what the MX represents. [*applause*]

**AARON:** I wish we were just talking about perceptions of vulnerability but facts are facts. They have the systems, they have the capabilities and I think we have to pay attention to Winston Churchill when he says he never argues with arithmetic. Now this doesn't mean that we're not going to be able, or shouldn't try to meet the problems of the Persian Gulf and elsewhere; we should and we can. But without the fundamental strength of our strategic nuclear deterrent, if we can't deter that, if we can't deter nuclear war, if our deterrent is being undermined, we're going to have more crises. We're going to have more crises in locations, we're going to have more contingencies that we have to meet, not fewer ones. So, there's no substitution for a strong nuclear deterrent.

**MOYERS:** Herbert Scoville, you've been jumped on from both sides here tonight, and what they seem to me to be saying to me— what they seem to be saying in respect to something that I read someone else had written once who said, 'Military forces do not exist simply to do certain things in war, but to fulfill political and psychological roles in peace. Now, do you think that the MX would fulfill such a role, a political and psychological role?

**SCOVILLE:** No, I don't think it does fulfill that role, because it doesn't do the job that it's supposed to do—

**MOYERS:** Which is? [*applause*]

**SCOVILLE:** It doesn't do the job of providing an invulnerable force or basing mode for our ICBMs. And secondly, what it does do, it increases the risk that the Soviets would actually launch an attack, rather than being a deterrent, because it is a direct threat to the Soviet deterrent itself. And in a time of crisis they are certainly going to launch a pre-emptive strike against our ICBMs, knowing that we could destroy those, theirs, if we fired first. So, it doesn't meet the criteria which Harold Brown, as secretary of defense, has said over and over again, we must never deploy any weapons system that could increase or give the Soviets an increased desire to go forward and launch a nuclear strike. Now that's just what this weapon system does, it gives the Soviets an incentive to launch a pre-emptive strike against us in time of crisis. That is dangerous. [*applause*]

**MOYERS:** Go ahead.

**AARON:** I would be— I would be— I would take the same position if the facts weren't contrary to what you say. The president, as we went through this, had all of these concerns in mind: how much counterforce discourages the Soviets from a build-up and how much of it is dangerous and would provoke the kind of attack that Pete talks about. The president is concerned with the shelter system, will the Soviets still have an incentive to attack, will they gain more from attack than refraining from attack. We went through these things very systematically. We took a year and a half to do so. The president was involved in every step. We had not just the Pentagon look at it. We had not just the joint chiefs of staff. We also had our intelligence agencies. We had outside experts, we had panels of scientists. We went through it extremely carefully. And the fact of the matter is that this is not a provocative weapon system. It will do the job of defending against the Soviet threat. It is responsive to increased threats. Those are the facts, and Pete, appealing to a different set of facts, and then saying therefore, the system doesn't work, is really just not correct. [*applause and booing*]

**MOYERS:** John Lehman, we talk about the MX and being invulnerable to attack, but the Minuteman missile was started in 1968 and by 1978 was deemed to be obsolete because it had become vulnerable. What guarantee do we have that the MX won't be obsolete by the time it is in fact put into operation? [*applause*] You're not supposed to be cheering the chair!

**LEHMAN:** I just can't let that last interjection of Pete's go by. I mean, everything that the Soviets have in the way of counterforce is O.K., but if we have it it's bad, and destabilizing. That's illogic.

**SCOVILLE:** No, I didn't say that.

**LEHMAN:** That's what you said, because they have it. Now the question of the vulnerability of the Minuteman, we got 20 good years out of the Minuteman, and the cost effectiveness of that system — and it still has a lot of residual cost effectiveness in keeping the peace — was damn good value. And if we get 20 years— [*booing*] if we get twenty years out of the MX, that will be very good value for the money put into it. Nothing is permanent, nothing is constant in the military balance. MX will not stay invulnerable forever, but it will certainly stay invulnerable for the foreseeable future as far as our the requirements for surviving missiles are concerned.

**MOYERS:** We'll come back to some of these questions and take questions from the audience to these panelists later in the program, but it's time now to turn to the second basic question, how should the MX be deployed and based? For that here's an introduction to the scheme proposed by the Air Force and approved by President Carter.

[*Film segment begins*]

**MOYERS** [*voice-over*]: This is the MX, Missile Experimental. Seventy-one feet long, almost eight feet in diameter, weighing one hundred and ninety-thousand pounds. It will have a range of 6,000 miles and be able to carry ten nuclear warheads. The Pentagon wants to bring two hundred missiles to combat readiness by 1989. What Americans are getting for the billions we will spend on the MX is a missile which is operationally capable of doing almost anything the Soviet SS18 can do. In particular, it can deliver each of its multiple nuclear warheads to within several hundred feet of an enemy target 6,000 miles away. When the MX is ready, the Pentagon says, America will no longer be vulnerable to the Russians silo busting capability. The MX does not have to be deployed as a land-based ICBM. It could be launched from submarines or from on-board attack bombers. In fact, the Air Force initially supported an air-born MX system. But a variety of factors, including rising fuels costs, led to a major shift of position. By 1976, the Air Force was strongly recommending placing the MX on land. This left planners with two key decisions: how to base the MX, and where. They had to consider five issues: survivability, verification, life span, environmental impact, and cost. Survivability is simply the potential to withstand a Soviet surprise attack with enough missiles to counterattack. Verification is required by the SALT arms treaty under which the Soviets will be permitted to verify the number of missiles we say are based there. The accepted method of verification is the use of photos transmitted from satellites. In other words, any basing mode must provide a view to the searching eye of a Soviet spy in the sky. The life span of the basing mode involves an educated guess. How long will it remain survivable before some new Soviet strategic innovation makes it vulnerable to attack and therefore, obsolete. The environmental impact of basing must, under federal law, be carefully evaluated and planned for. Finally, the cost. Some basing modes are clearly less expensive than others. The options on land were many. Off-road countryside crawlers, railroad or interstate roamers, canal and deep pond submersibles, lake bottom creepers, tunnel movers, garage dashers, air mobile lifters, and dispersed shelters. Out of this mixed — and, some said, Rube Goldberg — collection of proposed homes for the MX, the Pentagon has finally selected one. It's known as a multiple protected shelter system, nicknamed by some the 'shell game,' a descriptive title. Two hundred transporter containers will randomly shuffle MX missiles among 4,600 empty shelters. Presumably, it will be as difficult for the Soviets to guess the location of each missile as it would be to guess which shell hid the pea. They would be forced to destroy all 4,600 shelters to assure the destruction of 200 missiles. This would take more warheads than the Russians currently have without seriously depleting their reserves. Should they build more missiles, the Pentagon claims we could increase the number of shelters. Each of the MX missiles will be deployed on a closed circular roadway, a race track. Each of the 200 race tracks in the system will contain 23 horizontal shelters, approximately one and a half miles apart. A transporter erector-launcher, or TEL, will periodically move the missile back and forth among the 23 shelters on each race track. This prototype, while not exactly like the final version, gives you some idea of its size and shape. Covered and hidden under a huge shield which moves with it, the TEL will deposit the missile in one shelter while the shield deceptively continues to visit each of the others. An outside view from the ground or a satellite would not reveal where the missile is hiding. In the event of an enemy attack the missile will move from its shelter to the roadway for immediate launching. Some variations in the launching method are still under consideration, including one in which the tail could push through the top of the hardened shelter, or another in which the shelter could be vertical, like our current ICBM silos, rather than horizontal. Complicated final assembly procedures of the missile at the race track conducted in open view easily visible from a spy satellite will permit verification. In addition, each race track will be closed with an elaborate barrier after one MX is unloaded and assembled. The barrier would make it difficult to add any other missiles to the race track without being easily detected. It would be hard, if not impossible, to cheat. This is the MX system as presently planned. The favored site location is the Great Basin desert area of Nevada and Utah.

[*End of film segment — return to Symphony Hall debate*]

**MOYERS** [*at the podium*]: Dr. William Perry, you are the Undersecretary of Defense for Research and Engineering. Why do you believe the land-basing for the MX is the superior way?

**WILLIAM PERRY:** What is necessary, Bill, is to have a diversity basing so that we are not confronted with a situation where one part of our strategic force becomes vulnerable to attack and we are left totally without a nuclear deterrent in that case. We solved this problem by going both to a land-based system and to a sea-based system. In 1980 we are confronted with the problem where a land-based system is vulnerable to attack and we are depending on a sea-based system. And we will be depending on it for a good many years in the future.

**MOYERS:** Right now we're depending upon that leg of the triad?

**PERRY:** We are. By 1990 we may very well be in the opposite situation where the submarines themselves are vulnerable to attack and we will be very happy that we have restored the invulnerability of the land-based system.

**MOYERS:** You're saying that right now our land-based missile system is vulnerable? And we're relying upon a sea-based—

**PERRY:** It will be vulnerable in the next few years. Yes.

**MOYERS:** Let me quickly ask you, since you are not the father of this project but you're certainly a midwife to it, in a very stragegic position, let me ask you some specific questions for informational purposes about land-basing. Given that so much is gonna be at stake for the Soviets, won't they go all out to penetrate the location of the MX and how can you be sure, in an open society such as ours, that you're going to keep the location of that particular missile secret?

**PERRY:** We have two different ways of preserving the security of the system, Bill. One of them is maintaining the secrecy of where the missile is located. We have very elaborate ways of planning to do that. But in addition to that, even if the Soviet war planner were to believe that he had penetrated— Even if he were to believe he knew where those missiles were located, he still could not launch an attack against the system because, even if he knew where they were located when his missiles were launched, he could not be sure that our ICBMs would be in the same shelters when they arrived. And that is because we have designed this system so that the missiles could be moved quickly from shelter to shelter in an emergency.

**MOYERS:** But do you really think you could move what would be a total million pound weight, thirty miles an hour, without leaving some kind of seismic or other traits that could be detected by increasingly sophisticated devices?

**PERRY:** Yes. [*applause*]

**MOYERS:** If— All right. For example, I heard someone the other day say that plutonium gives off characteristics of such long duration that clever espionage could pick it up.

**PERRY:** There are perhaps a dozen different what we call observables that might be associated with the presence of that missile.

**MOYERS:** Observables?

**PERRY:** Observables— Things that could be detected in the presence of the missiles.

**MOYERS:** So, what do you do about those?

**PERRY:** We simply devise simulators for them so that the transporters that do not have the missile and have the same sort of detectable signals. It's a decoy system.

**MOYERS:** Doesn't it cost a lot more to try to make everything look like the real thing?

**PERRY:** Yes, it does.

**MOYERS:** If the MX takes direct hits, won't the fiberoptics melt and won't the radioactivity disturb the microwave and electromagnetic communications making it very difficult for our controllers to communicate with the missiles and give them orders?

**PERRY:** We have three or four different redundant ways of communicating with the missiles, Bill.

**MOYERS:** Alternative ways?

**PERRY:** Alternative ways, any one of which is sufficient to communicate. The one which probably would survive all of these different moods you're talking about would be a launch command given from our airborne command andcontrol stations in medium frequency radio signals. This would not be susceptible to the nuclear facts and would not be concerned with lines being destroyed on the ground.

**MOYERS:** You mean we would have an alternative command center airborne at all times?

**PERRY:** We have, yes. We will.

**MOYERS:** But I thought the Air Force had rejected the airborne MX because of the vulnerability of aircraft? *[applause]* No, no, it's a journalistic question.

**PERRY:** The vulnerability of the aircraft that they're concerned with in the airborne MX and in the B-52 is the escaping of the base. In other words, the airplanes are vulnerable when they are at or near their base. They can— An opponent could launch a barrage attack on the base. But if the airplane is flying at an unknown location, that vulnerability goes away.

**MOYERS:** I know this is going to strike you as an inane question, but won't the drivers of the vehicles be knocked off of their seats by such a nuclear blast? *[laughter]* That's just a simple question that appears to me. I mean isn't that—? *[applause and laughter]* I didn't mean that as a pejorative question.

**PERRY:** Bill, if the shelter— If the transporter and the driver are out in the open when a nuclear bomb arrives, the driver being knocked off the seat is gonna be the least of his problems. *[applause]* The system gets its security by being in the shelter at the time, at the time the missile arrives. And that's crucial to the success of it.

**MOYERS** At one point, the Air Force was recommending a tunnel system for the MX, but tests show that one hit by a bomb sent shock waves throughout the tunnels that would disrupt the entire system. How can we really know, Dr. Perry, what will happen to the MX? Won't there be massive confusion at the time of a nuclear attack? And isn't there a high probability that the system could be damaged?

**PERRY:** The system will be damaged— If they attack many shelters at once, every shelter that they attack will be damaged. Shelters that are not attacked will not be damaged. And the airplane then sending the command to control system will be able to communicate directly with that shelter. The point though of the system, Bill, is not which ones are damaged and which ones are not. It is to present the Soviet Union with an unacceptable problem.

**MOYERS:** Which is?

**PERRY:** They cannot— they cannot believe that they could successfully attack that system with their present forces, with the forces we project they might have during the '80s.

**MOYERS:** And you believe that the MX will be that deterrent?

**PERRY:** Yes. I really find the discussions of they do this and we do that rather arcane. The system is designed to prevent all of that from happening. It prevents it from happening by simply making the target so difficult to attack that no rational planner could believe that he could be successful at it. That's the key.

**MOYERS:** William Van Cleave, you're the Director of Defense of Strategic Studies at the University of Southern California, a consultant of the Defense Science Board and, among other things, a senior defense and national security advisor to Ronald Reagan. Given all these questions and the fact that we can't be absolutely sure of what would happen until the MX is precisely tried, what are your unanswered questions about the landbasing mode of the MX?

**WILLIAM VAN CLEAVE:** The principal unanswered question I have has to do less with the technical operational uncertainties of the full system than it does with my concern over the timeliness of the response. We're in a very bad situation. The reason we're in this very difficult position is simply because the Soviets have expended the effort, enormous effort, to make a deterrent force vulnerable while we have not kept pace. Instead we've sat by and allowed the Soviets both to reduce our options and to increase the vulnerability of our force. John Lehman pointed out that we had the Minuteman force for twenty years. We could have had that longer if we had earlier taken the measures necessary to retain its survivability and we did not largely because of SALT, I believe. Now, is there a need for a more survivable and more capable land-based ICBM force? Absolutely, in my viewpoint. Would the force with the system now being proposed by the administration work? I believe with further improvement in a technical and operational sense, it's a credible system.

**MOYERS:** But you have some problem with it?

**VAN CLEAVE:** I doubt that it's a politically credible system.

**MOYERS:** What do you mean?

**VAN CLEAVE:** Well, we now see a growth in the political opposition to the system that we cannot ignore. *[applause]*

**MOYERS:** Political opposition to the basing of this system here in Utah or political opposition of another kind?

**VAN CLEAVE:** I'm referring principally to the former.

**MOYERS:** To the basing of the MX here in Utah and Nevada?

**VAN CLEAVE:** I think that that is a very difficult problem we're facing right now. But I would also refer to another one. And that is the political uncertainty of this administration's intention, if it is re-elected, to continue this particular system. In the face of the opposition and the face of the problem that it is — whatever its advantages — it is still a system essentially for the '90s. The '80s.

**MOYERS:** Your problem, as I understand you, is not necessarily with the method of basing which Dr. Perry has outlined, but with whether or not the administration has the will to carry it through despite the opposition?

**VAN CLEAVE:** No, that's not quite it. My problem's a little bit different from that, and, again, it has to do with preserving options and with handling the critical matter of timing.

**MOYERS:** Would you base the MX in a different way? And, if so, what way?

**MOYERS:** The questions are the following. First of all, if this were the only alternative, I believe it deserves our support. I do not believe it *is* our only alternative. There are other alternatives. *[applause]*

**MOYERS:** Which ones?

**VAN CLEAVE:** They're alternatives which the Air Force and DOD have themselves favored and found preferable to this system in the past.

**MOYERS:** Which one would you prefer, Mr. Van Cleave?

**VAN CLEAVE:** I would suggest the following: I would suggest this year that we appropriate all the funding requested for the MX program; that we begin fullscale engineering development of the MX missile but, at the same time, we do R&D on modifying and canisterizing the Minuteman III.

**MOYERS:** You mean taking the missiles that are presently in the silos — the Minuteman III, our existing land-base — and upgrading them, retrofitting them, modernizing—

**VAN CLEAVE:** One of our major options or alternatives to this system which, in my view, could be made significantly operational pre-1985 while the MX program we now face is essentially post-1985, would be to redeploy the existing Minuteman III missiles in existing deployment areas but not necessarily at the expense of the current MX system. What I would like to do is not foreclose the options this year. I don't think we're ready to lock ourselves in to a particular system. I'd like— I'd like a choice open to Mr. Reagan in January. *[applause and boos]*

**MOYERS:** Dr. Perry, take just that simple— Out in the bleachers of Ebbets Field there's a rumbling going on. *[laughter]* Dr. Perry, what about the case that Mr. Van Cleave just made? Why don't we take the Minutemen III in their present silos and improve them so that they perform the function of being in vulnerable which you anticipate the MX will be?

**PERRY:** The only way to improve them, to make them invulnerable is to build two- or three- or four-thousand more silos which I presume is what Dr. Van Cleave meant. The only— I have no problem with doing that compared with the MX program except that it takes longer, is more expensive, is less effective, has even greater political uncertainties. *[applause]* The timing factor here is not the time it takes to modify the Minuteman missile and develop the TEL and test it. That could be done as Dr. Van Cleave suggested before 1985. The problem is the same as the problem in Utah and Nevada. We have to fulfill an environmental impact statement. We have to fulfill a land acquisition program. Those are the facing items in the schedule. And it would be no less complicated in the stage where the Minuteman's located than here.

**MOYERS:** Why did you want to put the MX, Dr. Perry, all in one location here in Utah and Nevada? Why not spread out whatever benefits there are economically and whatever cost there is? Why didn't you— *[applause]* Why didn't you spread it out in more than one area?

**PERRY:** We are still looking at other areas beside Nevada and Utah. We're looking at the possibility of deployment in a large area in northern Texas and New Mexico. The study on that is not yet completed, Bill, but it seems clear so far that *that* can be done. It will be more expensive to do that, to split the bases that way. Even so, it may be something worth considering.

**MOYERS:** Sidney Drell, you're a member of the president's Science Advisory Committee and executive head of theoretical physics at Stanford University's Linear Accelerator Center. Do you have an alternative to the land-based MX?

**SIDNEY DRELL:** Yes, I do. I do believe it's important to attend to the survivability of our forces. My opposition to the MX that we've been hearing is that I see that it is just not a good technical solution to a serious problem. We have studied other basic schemes and proposed as an idea the deployment of the MX missile on small submarines moving in near coastal waters. The basic principle is to use mobility, invisibility of the water, and to take the missiles away from shore. The idea of preserving diversity of our forces is an important one, which I support, and therefore we have talked not about just more of the same Trident submarine. We have talked about a basing system, all non-nuclear slowly moving submarines that could take advantage of proximity to our shore, the messier environment of operating in shallow, at shallow depths and in near coastal waters. And this is a proposal we have studied and propose as a way of solving the problem.

**MOYERS:** Well, let me ask Dr. Perry about that. Take just the four tests that the president applied to the MX. Is the shallow water submarine carrying the missiles survivable? As survivable as the land-based MX in your judgment?

**PERRY:** A totally different issue, Bill. And a much more difficult question to answer. We know what a threat to our land-based ICBM system is. We know what to do about that threat.

**MOYERS:** So, if you go to the sea, you really— you still are abandoning the land-based missiles?

**PERRY:** We still are— What we are doing is putting all of our strategic deterrent eggs in a submarine basket.

**MOYERS:** Dr. Drell has disapproved.

**DRELL:** It seems to me that it's not a question of whether you're at sea or on land. It's a question of what sort of operational procedures you introduce. For example, when you're worried about the submarines, you look at their command and control. You look at the guidance system for accuracy. You look at the problem they must face with the antisubmarine warfare capabilities of the Soviet Union. I'm here talking about the submarine system that is one-tenth in weight or less than each of our individual Trident boats. I'm talking about a non-nuclear submarine which has very much lower signals for acoustic detection in the waters near the coast. It takes advantage of its coastal proximity to have the capability of more robust command and control to achieve better accuracy using coastal radiators. Without being technical in detail, it is a totally different system and I believe the issue of diversity has to do with different threats to the system, different operational procedures, different failure modes. It has nothing to do whether its on land or on water.

**MOYERS:** What is the operational— [*applause*] Before we go to some questions from the audience, what is the operational — and I'd like to have Dr. Perry respond to this after you do, Dr. Drell — what is the operational advantage of the shallow underwater submarine carrying MX missiles over the land-based mode as you see it?

**DRELL:** Well, let's look at the problems of the racetrack. First of all, it is a system that gives us no survivable megatonnage against the projected Soviet threat until almost the entire 4600 launchpoints or shelters are constructed. That is the nature of a multiplane point system. You must have more targets than there are threatening warheads. Even under the SALT II limits, which we don't have ratified, one has to build more than two-thirds to three-fourths of that system before you gain anything. When you put a submarine to sea where it can move around, it's invisible, you gain survivable megatonnage for your deterrent with each step in proportion. The whole issue of deception, concealment, secrecy, which is required for the racetrack deployment in the middle of our society, that will be avoided. Will we *really* be secure? Will we really feel secure after the MX is deployed, that we have maintained secrecy over many months at a time in our society, or are we trying to compete with the Russians on their turf — secrecy and deception? [*applause*]

**MOYERS:** Dr. Perry, do you believe that the submarine has those advantages?

**PERRY:** I'm a strong supporter of submarines in many different applications. The submarine that Dr. Drell was talking about, as you point out, is not yet designed. It's only a concept. I do believe that we are quite capable of designing, developing, building and testing that kind of a submarine that would have many of the properties that Dr. Drell described. My problem with that is a simple problem and it rests in this description of the submarine's being visible in the ocean. They are invisible today. By the 1990s whether we will have learned a way or whether the Soviets will have learned a way of making the oceans transparent is precisely the issue. My judgment is that we ourselves will be able to detect and locate Soviet submarines at sea in that time period. I have no reason to believe that the Soviets will not be able to do a similar thing.

**MOYERS:** Isn't there— Aren't you worried that the same proposition applies to the land-based basing mode [*applause*] that no matter what we do— I mean, hasn't the history of military technology been that the system which is invented is finally overcome by technology, its bonds, and—

**PERRY:** Measure and countermeasure. And it happens in submarines, happens in the land-based systems, and our security comes from the diversity of the systems. Having both land-based systems and submarine systems so that they become vulnerable at different times in history. We have an opportunity to respond. We don't want to put our entire security in one system.

**MOYERS:** Thank you very much. [*applause*] I have some sympathy for men and women who deal in such technical issues, trying to answer the untechnical questions of journalists and politicians. And so I'm going to go to the audience now and put some of the burden on you and let's take a few minutes before we go to the third panel for questions from the audience to any member of the first two panels, to either side of me. Yes? A question from microphone number one here.

**WOMAN:** Yes. I would like to ask this question on behalf of my new little baby, whom I had hoped would have a good future. Perhaps in the future we will have SALT agreements again. Perhaps nuclear powers will even agree to disarm. And I want to know what we're gonna do with all these MX missiles. What I'm really asking is how can we ever beat this sword into a plowshare?

**MOYERS:** David Aaron, do you want to try that? And then Mr. Van Cleave.

**AARON:** I would say that the most important thing in trying to get real arms control is to maintain an adequate strategic posture so that the Soviet Union will be prepared to really reduce its forces, limit them and constrain its technology. We have shown restraint in the strategic area. The Soviet Union has not. And we have to take the actions necessary to defend ourselves. Now, will the MX fit in to an effort to reduce strategic arms? I think the answer to that is clearly yes. We're not proposing to deploy 4000 MX missiles in order to have a survivable deterrent. We're proposing not to deploy 1000 MX missiles. We're proposing to deploy 200. And deploy 4000 shelters so that the Soviets won't be able to attack them. This dividing of the survivability problem from the level of deployment is extremely important if we're ever going to negotiate reductions. We would like to get to a position where all the vulnerable systems were reduced, where hopefully all the systems were reduced. And let me just say something. President Carter is not the president who is known as an enthusiast of nuclear weapons. He came to this decision reluctantly. He knows the American people have not learned to love the bomb. And he hopes the American people never learn to love the bomb. But he's counting on their good sense to recognize that in order to deter a nuclear war, in order to negotiate real reductions, we have to be able to protect ourselves as well.

**MOYERS:** William Van Cleave, do you see a time and, if so, how do we get there when the swords will be beaten into plowshares, as this mother asks?

**VAN CLEAVE:** I have enough trouble with present day problems that I can see. My self-esteem is not up to tackling the impossible, which is worrying about this very hypothetical long-range problem. I think what we have to understand here very clearly is that we're in the terrible situation we're in precisely due to our attempts at arms control which have failed. Arms control was supposed to be two-sided and even handed; it was supposed to contribute to stability and reduce the need for strategic programs. The Soviet Union has built up a force despite a decade of SALT. It is now forcing us to measures to look to the survivability of our deterrent forces. SALT has had other pernicious effects as well. It has channeled the choice of our options for doing this. It says we cannot defend the force. It says we cannot significantly increase the force. It says we can conceal it only within certain parameters. And it says that we can only make it quasi-movable. It's done one other thing. With its emphasis on limiting missiles and launchers, it tends to drive us to larger missiles such as the MX. I support the capability the MX represents but I think without SALT, strategic logic would dictate that we put that capability in a larger number of much smaller missiles that would be much more easy to conceal, much more easy to make mobile and would not require the type of system which many of you now oppose. So you can thank SALT for that.

**MOYERS:** We'll come back to SALT later in the program I hope—a question from the second microphone.

**MAN:** Mr. Perry, you indicated that shallow underwater, as you see it, has a unknown future before it's detectable. We are told that our land-based system has no future as far as being detectable. Where do we go at the end of 4,600 shelters, where do we go to keep up with this race, another 5,000 shelters, another state into west Texas? Where does it all end in move, counter-move, move? [*applause*]

**PERRY:** The Soviets are confronting us today 6,000 warheads in their ICBM force. We have not found any simple, easy solutions or any single solutions for dealing with that problem and still maintaining the desired invulnerability of our forces. We believe that it is necessary to have a diversity of forces in order to deal with that problem. We also believe that we should put every effort, continuing effort, and in this I differ with Dr. Van Cleave, into arms control as a way of trying to bring this race to an end. But we are convinced that a unilateral disarmament is not a solution to the problem. Nothing that we have done in that vein in the last decade has had any influence at all in slowing down the Soviet arms race.

**MOYERS:** Question? [*applause*]

**MAN:** The triad philosophy aside, my question concerns Dr. Drell's SUM-mode. The SUM detraction appears to be the future vulnerability to attack. Soviets submarine ship or air attack would involve a massive movement of observable forces to sea and into our areas along our coastlines. It seems to me then that some SUM would provide us what we desperately want—early warning. So, if SUM's possible attack vulnerability is its greatest disadvantage, is it not its greatest advantage—early warning of Soviet intentions with time to react and or defuse the situation?

**MOYERS:** Your question is?

**MAN:** Is not its disadvantage also its greatest advantage in giving us great, I'm talking in terms of weeks, possibly, early warning?

**MOYERS:** What about that Dr. Drell?

**DRELL:** Well, I think that's quite true. I doubt we would sit quietly if a mass of Soviet ASW forces—

**MOYERS:** ASW meaning?

**DRELL:** Anti-submarine warfare forces, excuse me, were to come close to our shores. I think we might make that a rather difficult environment for them to operate in. We might generate noise, we might try and confuse them or harass them. I can't see us sitting by and letting massive forces of the Soviet Union come close to our shores.

**MOYERS:** But, I think his question was, does the submarine MX give us earlier warning than the land based MX would give us.

**DRELL:** It's hard to say. I think it's— the notion of attacks out of the blue with no warning strike me as the least sensible concern for us to deal with when we're talking about nuclear survival.

**MOYERS:** You think the attacks would be deliberate and following a certain—

**DRELL:** I think that— I tend to think that's so. But to answer the question, it would take a massing of resources to try and find these submarines. I think they would fail. But it would take a massive effort of resources to try and find. I'm talking about a large number of submarines, you understand, forty or fifty deployed, each carrying about two MXs encapsulated external to the pressure hull. And to try and attack a large number of submarines would take a vast number of Soviet naval resources.

**MOYERS:** And could be detected.

**DRELL:** They would be detected and they would presumably be made to be a little uncomfortable off our shores.

**MOYERS:** Let's go to the question now. Number two.

**MAN:** This question is for Mr. Aaron. I'm concerned that the United States government is spending millions of our tax dollars developing defense systems that it later finds inadequate and then discards. For example, the neutron bomb that was pushed so heavily in Congress just a few years ago, today we hear nothing about it, except that the government has discarded it in favor of the MX system—

**MOYERS:** Question?

**MAN:** —without explanation to us. What guarantee do we have that the government won't find the MX system inadequate half-way through its building? [*applause*]

**AARON:** Well, I think Dr. Perry indicated the MX system is responsive, it can deal with future threats, it does have the capacity to do that. It also has the capacity to deter the Soviets from trying to build up more threats against it because they will simply be piling more and more strategic power into what are somewhat vulnerable aim points. I'd just like to make a point about the neutron bomb. We haven't forgotten about it. The program continues. There is, the steps are taken to make it possible, if we decide we have to, to deploy it. So the program is not completely on the shelf.

**MOYERS:** Herbert Scoville indicated he'd like to answer that question about a guarantee that the MX won't be obsolete half-way through its operational deployment.

**SCOVILLE:** In fact, I think I would say that it probably will be obsolete before it becomes operational. [*applause*] The MX— The MX racetrack depends on the Soviets not having a significantly larger number of warheads than we have shelters. They will— they could have by 1985, 6,000 warheads which is why we had 4,600 shelters. The trouble is we won't have the 4,600 shelters until 1990 or 1989. Now, the Soviets can have 10,000 or 15,000 warheads by 1990 when the MX will be vulnerable. And that is completely inadequate, the 4,600 shelters is inadequate to deal with the problem. So the system is not going to be useful at the time it becomes operational.

**MOYERS:** Herbert Scoville. [*applause*] If— a follow-up question, then we'll come to you sir. If the Soviets keep building the warheads the race, in effect, goes on. Are you saying that we need an agreement with the Soviets to limit arms if the MX is to make any sense?

**SCOVILLE;** Absolutely. If you have no way of stopping the total number of Soviet warheads, all you have is an unending race in which probably we'll be blindfolded, because we won't know how many warheads they have, and it will go on forever.

**MOYERS:** John Lehman?

**LEHMAN:** The probability of MX has nothing to do with SALT, at least SALT II. We have no way of knowing under SALT II whether their, the Soviets, are indeed adhering to a so-called 10RV limit. And, in fact—

**MOYERS:** RV being?

**LEHMAN:** Re-entry vehicle.

**MOYERS:** Right. Ten warheads on a—

**LEHMAN:** If MX is to become vulnerable, the Soviets have to deploy enough re-entry vehicles to saturate the entire system. To do that first, they would have to deploy more missiles at this rate, because, to keep the capability, accuracy in order to kill an MX silo requires a high enough yield so that within the error of probability that you'll have— you are assured of taking out that silo. That means you have to have a certain minimum size warhead. And you can't put more than a certain number of warheads on a Soviet missile. So under the current projected deployments of missiles it is not foreseeable that they could deploy enough hard target killing warheads without going to more missiles. Now eventually they can do that, but if they do that we will know well enough in advance so that we can take measures to begin to overlay a sight defense to that system.

**MOYERS:** A response, I see two hands—

**DRELL** It's a technical point—given the technology that we are projecting for the Soviets when we say they can threaten our Minuteman force, there's every reason to credit them with the technology by the end of the 1980s to put three times as many hard target silo killers on their present missile force with no new missile construction. In fact the MX racetrack does certainly require SALT II, because only with SALT II that they are limited to ten warheads per large missile. That is one of the most important features of SALT II which were ratified at this point. Without that limit the Soviets certainly could triple their number of warheads and, as Dr. Scoville said, the racetrack will never catch up to the threat.

**MOYERS:** William Van Cleave, and then we'll take two more questions.

**VAN CLEAVE:** My two points are very simple, but I think, somewhat profound. First of all—

**MOYERS:** A little modesty—

**VAN CLEAVE:** SALT has nothing to do with what the Soviets plan to do, simply because the Soviets plan what they want to do before they accept the terms of the SALT agreement. [*applause*] Secondly, if the Soviet Union were to go ahead and add all of these re-entry vehicles in order to defeat our planned deployment, no one should have any doubt any longer about Soviet intentions. [*applause*]

**MOYERS:** Yes sir?

**MAN:** A technical study made public on Tuesday by either the Department of Defense or by the Air Force, disputes the claim that a new missile system such as SUM—

**MOYERS:** SUM being the submarine.

**MAN:** Right. Would be cheaper and better than the planned MX race track deployment. Such action by the Department of Defense or by the Air Force on the eve of this debate, after having repeatedly denied the existence of such a report, I find to be unconscionable. This action strengthens my belief that feasibility tests of principal competing modes are absolutely essential in preference to staff studies.

**MOYERS:** Question?

**MAN:** My question, I've taken 43 seconds. My question is, what feasibility tests for competing modes have been made or are contemplated?

**PERRY:** I'd like to correct some misinformation, first of all. The two studies that were being referred to have been underway for several months. They have been widely advertised. For example, Dr. Drell, one of the SUM proponents, was well aware of the studies, and was sent a draft of the studies to review. But the study was not done by the Air Force, it was done by the Navy. And therefore, presumably had no vested interest in that particular outcome. Let me correct those points first of all. The study did conclude, as you suggest, that there was no particular advantage to the SUM system.

**DRELL:** I welcome the existence of those studies because, as a technical person looking for an alternative to a clearly flawed race track, I was hoping we would find some studies being made in the Pentagon of these ideas, which may not turn out to be the best ones, but which looked good to me. What I learned from that study, and I welcome very much, were that in fact there have been very little, they were based on very thin analytic basis. I am quite happy to have those studies now to criticize before you. First of all—

**MOYERS:** Quickly—

**DRELL:** Very quickly, but very deeply. First of all, they said SUM was very unlikely to be available before the 1990s. They suggest therefore, it would take us longer to build simple little, non-nuclear boats, than it took us to build the first nuclear powered submarine and then redesign it and put to sea the Polaris boat. That to my mind is unreasonable. Secondly, they said that it would not be cheaper. I have been through the cost analysis and it's a matter of assumptions. I just will say I disagree. I think the, using their cost methods and reasonable assumptions and our basing ideas, the SUM system would be ten billion dollars cheaper than they said. Finally, they said it has no advantage vis-a-vis the antisubmarine warfare problem, to the Trident. I just don't know how anybody can say that without a detailed study that I know has not been done, since you're dealing with a boat that is putting out less than one-tenth the power, is operating in different waters, is making very different acoustic weight, or magnetic anomaly signals, is a very much smaller and quieter boat.

**MOYERS:** Thank-you. [*applause*] Last question here.

**MAN:** I would like to direct my question to Mr. Aaron. It's fairly simple. I want to know if the United States government has any long range plans for global disarmament, and if so, what are they? [*applause*]

**AARON:** We had hoped that right now we would have a SALT II agreement and we would be in the process of trying to negotiate real serious and severe reductions in the SALT III negotiation. We would like to turn down the strategic arms race. That's our program, that's our plan. But it takes two to do it, we can't do it by ourselves. And if we try to do it by ourselves, we really undermine the incentives on the part of the Soviet Union to show restraint themselves.

**MAN:** [*inaudible*] has been perpetuating the arms race till this point, and my next question—

**AARON:** Let me say that I don't think that's right, I don't agree with Mr. Van Cleave. I think we have made progress in SALT. I think we can be gratified that we have a SALT I agreement. I think we can be pleased that we're not engaged in both a defensive strategic arms race as well as an offensive one. I won't deny that we are in an offensive arms competition, and I think we have to put ourselves in the position that we were in during the ABM negotiations of having the capacity to protect ourselves so that we can finally convince the Soviets it's time to turn it off.

**MAN:** Do you honestly think that this will convince the Soviets to turn it off?

**AARON:** Well, I think we have to be prepared to negotiate as much as possible to do that. But at the same time, if we can't convince them to turn it off, we've got to protect ourselves.

**MOYERS:** Thanks for those questions. We'll be back to the audience later. But having considered roughly whether we need the MX and how it should be based, let's raise the issue of its impact on Utah and Nevada. Here's a glimpse of what the MX means for this part of America and the people who live here.

[*Film segment begins*]

**MOYERS** [*voice-over*]: This is the number one Air Force choice as the location for the MX racetrack basis, the Great Basin of Utah and Nevada. Thousands of square miles of what at first site appears to be a barren expanse of desert. But this is land that is home for third and fourth generations Utahans and Nevadans who live in towns with names like Hinckley, Deseret, and Enterprise. And it was home to their ancestors who journeyed west to conquer this land and stay to live with it. It was home to generations of native Americans for centuries before them, the Ute, Hoshute and Shoshone, the North Paiutes, and the South Paiutes. Some of the descendants still live here. The Great Basin is also home for the antelope, the eagle, the prairie dog, and the cougar. Nevertheless, the Great Basin looks desolate, vacant, and hence, available. In fact, one Air Force general described it as a big sponge suited for soaking up enemy warheads in the event of a nuclear attack directed at MX bases. MX planners were quick to disown the big sponge as a descriptive label. They've been equally quick to mount a major campaign to convince the residents of Utah and Nevada that the Great Basin can survive the MX and even benefit economically from it. On any scale the dimensions of the MX bases are huge. The racetrack bases will sprawl across 45,000 square miles of federally owned land, an area roughly the size of Pennsylvania and will require the building of some ten 10,000 miles of special roadway. Planners claim the actual area restricted to public use and each of the 200 racetracks will be less than 60 acres, a total of 25 square miles off limits. The force must be mobilized to construct the MX system is mind boggling. The construction effort will be the largest public works project in U.S. history. It would dwarf the Alaska pipeline and the Hoover dam. At its peak it would require 20- to 30,000 construction workers. They will live and work for several years in an area where the relative population density is now half a person per square mile. When the construction force withdraws, 15,000 Air Force and civilian personnel will be left behind to operate the bases. As much as the threat to its fragile ecosystems, or the loss of water and mineral rights, it is the mass of humanity poised to descend on the Great Basin which concerns its residents. They fear that the MX construction project will create a series of 'boom towns' across southwestern Utah and southeastern Nevada with increased crime, strain on public services from hospitals to schools, and social ills, divorce, alcoholism, and drug abuse. Whatever the result, one thing is certain, life here will be different. Utah is already a state facing enormous growing pains. The proposed intermountain power project is a 3,000-megawatt coal generating plant, the largest in the country. IPP, as it's known, is scheduled to be at the peak of construction in the mid-'80s when the MX project will also be full-swing. Then there are the Central Utah Water Reclamation Project, synthetic fuel development in the Eureka basin, and new school construction costing a billion dollars. So people here are asking if the MX will not overtax the state's capacity for orderly growth. The governor of Utah, Scott Matheson, suggested that it's not enough to ask if the MX should or can be built. The question should also be asked, 'But at what cost, and to who, and with what long-term result?' Under federal law the Air Force has been required to answer those questions. It must prepare an EIS, an environmental impact statement, reporting as accurately as possible, the social and environmental effects of MX deployment in the Great Basin. The Air Force will be examining the MX project as it affects energy and nonrenewable resources, water resources, air quality, archeological and historical sites, native Americans, land use and land rights, public health and safety and terrestrial and aquatic ecosystems. The list is not exhaustive, but representative of the scope of the environmental concerns with which the Air Force must deal. To gain some measure of the public attitude and concerns in the Great Basin, the Air Force has conducted a series of what are termed 'scoping sessions' in various communities. Some sessions led to angry confrontations between skeptical residents and defensive Air Force officials.

> **MAN:** We got a chance right now to support a land-based missile that will stop the Russians from taking over superiority in the world.
>
> **MAN:** I don't feel the MX missile system is a valid or a wise use of America's land here in Nevada.
>
> **MAN:** Frankly, I have a hard time believing the things that you've been saying here today. [*applause*]
>
> **AIR FORCE OFFICIAL:** I wonder how many people in Russia, if they were trying to deploy this, how many town hall meetings would a Russian air marshall come to and try and explain the case to the people?

**MOYERS** [*voice-over*]: The scoping sessions have made it clear that many Utahans and Nevadans are upset about MX. They are torn between a patriotic desire to support the national defense and a concern for the quality of life in their states. Ranchers wonder whether precious water and grazing rights can be adequately protected. Miners wonder whether mineral rights that represent their livelihood can be guaranteed. The Great Basin listens to the politicians, the Air Force, the experts, and waits; waits, wonders, and worries.

[*End of film segment — return to Symphony Hall debate*]

**MOYERS** [*at the podium*]: Stan Albrecht, as a professor of sociology at Brigham Young University and a specialist in the effects of rapid growth in local areas, what is going to happen to communities around here when the MX arrives?

**STAN ALBRECHT:** Bill, I think one of the primary concerns being registered by the citizens of these states, as well as the citizens by the state of Nevada, is the very question that you ask. What will the MX system, assuming it is deployed, mean for the small rural communities of this state? Given the relative smallness of these communities, given their geographic isolation, given their social and cultural homogeneity, given the demographic history that they exhibit long periods without migration, older populations, I think we can predict the social impact on these communities will be far greater than many of the other impacts that we have talked about, we've given greater attention to.

**MOYERS:** What do you mean, 'social impact'?

**ALBRECHT:** Social impact. Let me identify two major areas of concern very quickly. First of all, what we frequenly refer to as community infrastructure, the ability of the community to provide educational facilities, police and fire protection, housing, things of this nature. And then on the other level, something that is probably much more difficult to either define or measure, and that is the whole issue of breakdown in community, the problem of community cohesion, community integration. And it's really the breakdown at this level that we believe as sociologists contributes primarily to the social pathologies that we oftentimes observe in boomtowns, pathologies like increased crime rates, increased delinquency rates, higher suicide rates, things of this nature.

**MOYERS:** Those have happened where boom-growth has occurred for reasons other than the arrival of a national defense system, right? Coal mining, uranium mining—

**ALBRECHT:** Yes, yes. Most of the data dealing with these problems does come from energy development communities, the communities that have grown very rapidly as a result of a new coal mine, new power plant.

**MOYERS:** If we are willing to take that kind of growth in such areas for economic purposes, for uranium mining, etc., is there any reason why as a sociologist, you find people more unwilling to take it for a defense purpose?

**ALBRECHT:** I think the willingness to 'take that', using that phrase, has probably decreased rather significantly for whatever reason, whether it's economic, mining, power plant, or whatever. This does not mean though, that these communities cannot reap a great many benefits from growth. And I think that's the other side of the question that needs to be dealt with.

**MOYERS:** Will these communities that you've looked at in Utah and Nevada be able to handle this boom-growth brought on by the MX?

**ALBRECHT:** The benefits are primarily economic. They tend to be exported. The costs primarily are of a social nature, they tend to remain in the local communities and I very seriously question the ability to adjust adequately to the impact that will be imposed upon them.

**MOYERS:** What do you mean, the benefits are exported?

**ALBRECHT:** Benefits in the form of economic benefits primarily.

**MOYERS:** Have you ever heard of a case where large scale rapid population growth has been handled well by a small community suddenly overrun by the arrival of such large forces?

**ALBRECHT:** Not if that community has experienced growth of the magnitude that we're talking about here tonight.

**MOYERS:** You're really talking about sufficiently large growth.

**ALBRECHT:** Yes, very definitely.

**MOYERS:** Antonia Chayes, you are the undersecretary of the Air Force with responsibility unsought for this part of the MX. Why do you think the rapid population growth brought on by the MX will handled any differently here from the circumstances described by Professor Albreck elsewhere?

**ANTONIA CHAYES:** Because we will see to it, that it is handled well. [*laughter*]

**MOYERS:** We being—

**CHAYES:** Despite the jeers, let me explain what I mean. We can plan growth, growth is not one or two years. We're talking about a build-up that begins in 1982-3, goes on with peak years in 1987 and tapers off in 1989-90. What we mean is that if the state and local communities join with the federal government in planning for that growth, the benefits will not be exported, the size of the economic boom, the indirect industries, the indirect growth can be controlled. We're talking really about numbers that are not that staggering. We're talking about a steady state employment of 14,000 direct employees and 4,000 indirect. And even that can be made less.

**MOYERS:** By steady you mean the number of employees left after the construction is over.

**CHAYES:** Right. Even in the peak year of 1987 where we would anticipate 35,000 direct employees involved in construction and even giving the highest numbers of 30,000 indirect, that is seven percent of the present Nevada-Utah labor pool. Then, we're even assuming the worst case, that we don't take up the unemployment slack.

**MOYERS:** Secretary Chayes, you and professor Albrecht disagree on something. He said that most of the economic benefits are exportable. I'm not sure though what that means professor Albrecht. And you said, secretary, that they're not exportable. Now could we address that for just a moment. What do you mean when you say that they are exportable? Do you mean the money that is made leaves the community?

**ALBRECHT:** What I mean by the benefits being exportable is the advantages of rapid industrialization tend not to acrue to the local residents.

**MOYERS:** To whom do they accrue?

**ALBRECHT:** They go to outside construction workers that are imported to the area. They go to industries. What oftentimes happens in a rural community is that the local establishments, the local grocery stores, instead of really benefitting, is replaced by the chain store. So the benefits again go to an organization that exists outside the local community. This is what I mean.

**MOYERS:** And you say that that's not going to happen?

**CHAYES:** No, I'm saying that figuring conservatively, we say that an annual payroll of $170 million a year will exist in these areas. Now that can be controlled up or down to a certain extent by the state planning. States *do* control the economic development. I have seen states that have come from an area that is losing industry in New England and is making valiant efforts to gain industry in New Hampshire that has succeeded. The states of Nevada and Utah can control that by the efforts that they make — those additional benefits. In fact, you talk about the social cohesion, there are drains out of these rural areas now. People's children are leaving and they're going to be big cities, not only the big cities in the state, but the big cities out of the state. We've talked to many people in the deployment areas who say we welcome the MX because that will give economic opportunities, jobs for our children and make them want to stay.

**MOYERS:** Secretary Chayes, as I understand it, in order to meet the Air Force's own time table for making the MX operational in the '80s, you're going to have to do a thorough environmental and social impact study by November of this year. Can you really do that?

**CHAYES:** Yes. [*applause and booing*] You better believe we can!

**MOYERS:** Professor Albrecht is shaking his head.

**ALBRECHT:** I would like to respond to that. I think the work that has been completed to this point, particularly in the social areas, has been totally superficial. I think there's absolutely— [*applause*]

**MOYERS:** Why do you say that? Why do you say it's superficial?

**ALBRECHT:** It's easy for us to deal with things like numbers of new classrooms that will be required. Most of the work that I have seen that has been accomplished, that has been completed to this point, deals at that level. We can sit down and count the number of new school children that are going to arrive in the community. We can then calculate the number of new classrooms that will be required to house those new students. We can project the number of policemen who will be needed. One of my colleagues once made the observation that people in boom towns do not commit suicide because of inadequate sewer systems. They commit suicide because of inadequate social systems. So the problem I see is that as long as we deal on the fairly superficial level of simply counting numbers we're not going to get at the basic issues of community that are so important to current residents of these counties in Utah and Nevada. [*applause*]

**MOYERS:** Secretary Chayes, the lion's den is yours.

**CHAYES:** I invite you to look at the work we are doing because I don't think that is fair. We're not simply counting miles of sewer pipe, we are not simply counting classrooms or hospital beds. We're doing very complex, state-of-the-art, socioeconomic modeling. Now it is true, we can only state the kinds of services that would be expected to deal with the influx. We cannot assure that the states will provide those services. But many of those services are federally funded. We have provided for the planning process by our military construction appropriations in 1980, and it will be repeated in '81 and '82, funds to help the states to develop the capacity to do that kind of planning. What you're talking about is not analysis. What you're talking about is social planning. And of course, the states have do to the kind of planning, or maybe the localities where the impacts would be. If you even have 5,000 more people in these rural areas, you're going to strain the systems. And whether that amounts to suicide or whether that amounts to juvenile delinquency, yes we know, this has taken place, studies have shown this in Wyoming and elsewhere. But those very same studies show that the kinds of services that we know well how to do, social services, can mitigate that so they really aren't problems.

**MOYERS:** Frederic Wagner, you're an environmentalist who has conducted ecological studies of the Great Basin. Do you believe that the Air Force can measure in advance what the MX will likely do to the Great Basin from an ecological standpoint?

**FREDERIC WAGNER:** I'm going to have to add some fuel to this fire. The Air Force has spent six to ten years developing and researching the MX missile. As of a week ago the subcontracts had not yet been let for many of the environmental assessments. And this is a matter of studying impacts that are of such enormity and complexity that they can't be studied in the matter of a few years. The total resources committed to those assessments are miniscule in comparison to what's really going to be needed to determine those.

**MOYERS:** Let me ask you a question, Mr. Wagner. After the MX is obsolete, if it becomes obsolete, can any damage to the desert be repaired? Can the desert be reclaimed?

**WAGNER:** We've seen on the film strip their mark, and we read it repeatedly, that deserts are fragile. What that means is that they're easily disturbed and they recover at a glacial pace. There are some ways of mitigating desert damage, but those become increasingly difficult as you reach lower and lower rainfall levels. And we're dealing with an area of rainfall somewhere between four and eight inches where some of the mitigation — ways of mitigation — have not yet been determined.

**MOYERS:** We have invited to the stage here four citizens of Utah some of whom are for the MX and some of whom are not. One is — actually, three are from Utah, and one is from Nevada — who have some questions to put to the panel. And I'll turn the chair over to them collectively. Sylvia Baker is from Baker, Nevada. She is a rancher's wife and a mother. Richard Jefferson owns a grocery store in Milford, Utah, population 1,300. Carol Nielson is from Glendale, Utah, population 94. I made sure that was 94, not 94 households. She says 94. She's a housewife. Her husband is the mayor. And Cecil Garland on the end down there is from Callao. And he says the population of Callao is about 19. [*applause*] He is a rancher. Cecil what question would you like to put to any one of these three panelists?

**CECIL GARLAND:** Well, I believe I'd like to kinda address mine to any one of them or maybe all of them, maybe everbody here and you to. It seems to me that I been hearing the experts justify being experts here tonight and it hasn't really made me feel a lot more secure. [*applause and laughter*] Well, it degenerated into discussion of what mode was the best, the land mode, or the sea mode, or the air mode. I'd like to suggest a fourth mode, the commode — [*more applause and laughter*]

**MOYERS:** Cecil, you are prejudicing the audience. Would you please ask a question.

**GARLAND:** —in which the concept of war as a way to settle things was flushed down the drain. The question I'd like to ask, cause we talk an awful lot of peace is but we do damn little about it. Now I'd like to ask if we're going to spend $35 billion up to a $100 billion on the MX system, which can possibly annihilate civilization, is anybody willing in this panel or anywhere else to spend say a hundred percent of that to go over the earth with an audio and visual system to describe the horrors of nuclear war, what happened to Nagasaki and Hiroshima, to the people so that they might decide that sanity is better than insanity? [*applause*]

**MOYERS:** Thank you, Cecil, for that question. Secretary Chayes will try to answer it. That's the prerogative of the chair. [*applause*]

**CHAYES:** As a strong arms controller myself I have to say that our restraint in not building up to the limits of SALT I was not reciprocated by Soviet restraint. [*applause*] Please do not misunderstand that this president, who first and foremost in his program in 1977 was arms control, is building a very expensive, survivable system for any other reason than deterrence. And it is simply a difference in theory. I know you won't cheer, but please think about it.

**MOYERS:** Carol Nielson from Lynndyl, do you have a question?

**CAROL NIELSON:** Yes, I do. I think one reason for the emotional outpouring over MX is that we're being forced to think the unthinkable, to consider what we would really rather not. But I believe it was Socrates that said that the fears that people have about what might happen are always worse than what might actually happen. We hear a lot about the fears that people have about MX. I would like to know, Secretary Chaves, what is the positive side of the coin from an economic and environmental standpoint?

**CHAYES:** Well, I think the positive side from an economic viewpoint is that there will be 12,000 jobs. There will be a payroll of, as I said, $170 million per year. And if the state wanted more, there could be more. I know it's hard to believe, but there will be environmental, there can be environmental advantages, if we plan this very well. [*booing*]

**MOYERS:** Go ahead and tell, what environmental values and Mr. Wagner can—

**CHAYES:** I'm not saying there won't be environmental disadvantages, I'm not saying that we will not disturb a fragile desert ecology, we will. Ten thousand miles of roads will make a difference. [*laughter*] The extensive water use in construction will make a difference. But we will be finding water sources, sources that cannot be searched for and found commercially because it costs too much, but sources that do not cost too much for a defense system of this magnitude. The benefits to the flora and fauna, to the grazing, for that will be very great. These states will no more, these states are, really don't know much about what they have. There are some areas of study— [*booing*]

**MOYERS:** Let her finish.

**CHAYES:** Hear me out. Hear me out.

**MOYERS:** Please, please, let her finish.

**CHAYES:** We have worked, if you look back at our milestone to EIS published in 1978—

**MOYERS:** That's an environmental impact statement—

**CHAYES:** —environmental impact statement — we learned a great deal then. And that was a study simply to pick a basing mode about these states. We are now doing intensive drilling, for example. Other states know a great deal about their water resources. Nevada and Utah know very little comparatively speaking. These valleys have not been drilled. There have been some drilling for shallow aquifers, not for medium aquifers, and almost no drilling for the very deep aquifers. These things we are doing. You will know what water you have. Now, like the system or not, whether it gets built or not, these values are very, very important for any development that might ever occur in the state. [*applause*]

**MOYERS:** Mr. Wagner, would you add something to that? Do you believe that there are some ecological benefits?

**WAGNER:** Well, I'd like to address just the question of water.

**MOYERS:** All right.

**WAGNER:** And it's true what she says that the water resources in those regions of Utah and Nevada have not been adequately explored. There are a number of aquifers known. Some of these are self-contained. Some are fed by rainfall or snow from the mountains. Some interchange with each other. But in fact, the whole working of the system is inadequately known and that's one of the frightening parts. Because we're, because the water demands of this program are going to be tremendous and we don't know what the water impacts are. And this is another point in this, in what I said earlier, that we're being rushed into this whole effort without really having adequate assessment of what the situation is.

**MOYERS:** Mr. Wagner, I've read that the MX will need 100 billion gallons of water. I don't know if that's a true assessment or not. Does that sound reasonable?

**WAGNER:** I don't know what it's based on.

**MOYERS:** Is that true, Secretary Chayes?

**CHAYES:** No, that is not true. We are really talking about 12,000 acre feet a year. We're talking in the one valley of the one area that would contain a main operating base. And there's one in each state that we would plan 6,000 acre feet in any one valley. That's only 77 percent of Carson City, Nevada. We're talking at the peak period of construction, and that's what uses most of the water, the construction, 2,500 acre feet in any one valley. That is far from the numbers that you have heard.

**MOYERS:** I'd like to turn to Richard Jefferson, our grocery store owner in Milford. And let me ask you a question, Mr. Jefferson. If the MX is needed do you believe that Utah and Utahans should sacrifice in the national interests and for the national defense?

**RICHARD JEFFERSON:** Not any more than the rest of the nation. [*applause*] Wherever there's a military base someone sacrificed something, either their land was taken away from them, or their water was taken away from them, or both. They were compensated for it, but to take up people's roots, there's no way you can pay.

**MOYERS:** Do you have a question you'd like to ask of any of the—

**JEFFERSON:** Yes, I'd like to ask Mrs. Chayes. Water is a commodity that's bought and sold, traded here in the west. Now is the Air Force going to buy water rights or are you going to take them from us, or what? [*applause*]

**CHAYES:** We have made the statement publicly, the president has made the statement that we will abide by state law. That is the important point number one. We do not intend then to take private rights. We don't believe we would have to purchase water rights. In fact, though, we have been offered water rights already in certain areas. If we were not able to tap new resources it would be our preference to lease water rights. We're certainly contemplating buying water. This is what our standard way of doing things is. But we do not intend to permanently purchase water rights.

**MOYERS:** Sylvia Baker, you've been quiet. What's on your mind about the MX?

**SYLVIA BAKER:** One of the things I'd like to know about is what kind of security system for the missiles, for the shelters on the racetrack, will be employed. And will this security system under the point security plan be adequate security for the missiles, for the system under duress, under threat of sabotage, or spying activities. And the other side of that coin is how can you at the same time as you provide adequate security also protect and provide for the multiple use of those lands adjacent to the racetracks, that use being made by livestock producers, miners, recreationists carrying on their everyday affairs? And what kind of surveillance or security measures will we have to undergo in order to use those lands? The additional part of that question—

**MOYERS:** Could she answer that first. I'm getting lost, not her. Go ahead.

**CHAYES:** We did a very careful study as to whether point security would work. It is our belief that point security will work. It has worked well in far more populated areas where we have the Minuteman. We have examined very closely the present uses and these are primarily mining exploration, grazing and some sparse recreational use. A point security system would not work in a densely populated area where there were many houses. One of the reasons that we prefer Nevada and Utah is that there is not that kind of density scattered throughout the area. There are not many farm houses. There're really not any farm houses. The kinds of surveillance systems that we're talking about are radar. They're mobile. They have alarms that are set off by numbers of events, cars moving and so on. And these can be observed. We can predict and we anticipate some growth, some additional movement in the area that is probably related to the curiosity in the system if not the operation of the system. And our studies show that we can handle this and still preserve the location's uncertainty. And therefore, we feel relatively confident that this can be managed. In my view an MX system that required area security that would have to exclude all other uses would simply not be buildable and we would have to be looking for an alternative.

**MOYERS:** If some of you who have questions from the audience would move towards the microphones, I'd like to ask one of Professor Albrecht, who is our expert here on boom towns and their effective rapid growth on small communities. What could the Air Force do in order to help these communities get ready so that not only will the adverse affects be diminished, but the positive benefits of the MX will be enhanced. What could be happening now? And is it?

**ALBRECHT:** I'm not sure how much planning is being done in some of the areas that are being discussed in the media. For example, in the last three or four days there has been some discusssion in local newspapers about the possibility of not having any of the construction workers actually live near the sites, the construction sites. But in fact they would live in cities like Salt Lake and Las Vegas and Reno, Nevada. And then they would fly them in on work weeks, I assume. I guess if you put all of the people entirely out of the area and build a fence around it you might mitigate some of the potential negative impacts on the community. I don't really think that is feasible. Again, the problem we have is that it is relatively, and let me emphasize relatively, relatively easy for us to deal with infrastructure problems if we have sufficient advance planning and sufficient front money. Now that front money is not available in the local communities. I don't think it's available in the state. But I think it is much more difficult for us to adequately mitigate some of the other problems that are associated with the tremendous changes that begin to occur in communities, when the old-timer wakes up in the same bed but in a different town and then has to deal with that town as it has changed as significantly as it has. The problems of mitigating impacts on people that live on fixed incomes, the elderly, the retired, and there are large numbers of retired people living in these communities.

**MOYERS:** Are you suggesting that inflation will be one of the consequences?

**PERRY:** Yes. Very definitely. Inflation will be one of the very important costs that has to be borne locally. And I'm not sure that anyone has ever developed an adequate mitigating strategy for dealing with those costs that are borne by current residents of the affected communities.

**MOYERS:** You mentioned federal monies, upfront monies. And as I understand it, federal monies are still set by voter population and that there will be four Utah counties and three counties in Nevada that will not receive a contribution of significantly more money. Madam Secretary, why haven't the Air Force or President Carter promised more to alleviate the strains from the kind of growth Professor Allbrecht is talking about?

**CHAYES:** I believe that indeed we have. The president in meetings with both governors stated that economic impact funding would be secured and we have already gotten the initial planning money that we promised to get. That will not be done by county. That kind of special economic impact planning or economic impact funds — the actual construction money or other kinds of funds — must come through some sort of special legislation as it did in the case of the Trident building in Bangor, Washington. We learned a lot from that. The system wasn't perfect but a great deal of money — $60 million — was brought into that community. And that was a much smaller impact. This has to be done through earmarking or entirely new programs.

**MOYERS:** Let's have a question now from microphone one.

**MAN:** Yes. We're talking about an impact in these aeas of not just tripling or doubling the population, but ten and twenty times the population that's currently there. My question is, what form of compensation does the Air Force believe can be given to local residents for totally destroying their preferred rural way of life? [*applause*]

**CHAYES:** In the first place, it sounds as if we were entering all the rural areas of Nevada and Utah with our entire armed forces. That isn't the case. We're talking about building one main operating base with 14,000 employees, most of whom are military, and their families. And that is half of that number in each state. Now it is true the particular locality in which the main operating base would be found would become quite a different community. But that is one. We are looking at alternatives of three or four in each state. We have invited the states to plan. As a matter of fact, there has been contact between the state planning offices and the Strategic Air Command, so that if certain communities say, please stay out, we have alternatives. The main operating base location, in fact, involves quite a bit of flexibility so that dislike of growth or strain on water or some fragile ecology would permit us to move to a number of other sites in either state.

**MOYERS:** There's a question over here. Briefly, sir.

**MAN:** Yes, sir. Do the environmentalists' have a program to restore rare species if we are hit by our enemies' nuclear missiles? Michael J. Prosit of Peter City. [*applause*]

**MOYERS:** Do you mean such as human beings?

**MAN:** Yes.

**MOYERS:** Such as human beings. Mr. Wagner, what about that?

**MAN:** We don't seem to count.

**WAGNER:** We haven't yet devised a way to recreate a species.

**MOYERS:** Cecil Garland, did you have a quick question? Because we have just about two more minutes in this televised part of this Town Hall.

**GARLAND:** I have a copy of the *Lincoln County Record* here which has got a letter in it from the good undersecretary here to the—

**MOYERS:** I don't think we're gonna have time to read it.

**GARLAND:** —chief of staff. But the governor of the state of Utah and the state of Nevada have both suggested that the Air Force ought to be looking at some other place, maybe like Plains, Georgia. [*applause*] And this letter says from the undersecretary, which I'd like to get a comment on, that we're gonna go someplace and do a fake study. We'll trump environmental objections to it, throw the whole thing out and come back to Utah and Nevada. Now—

**MOYERS:** Is that in face what's happening? The clock is running—

**CHAYES:** Baloney. I never said that. Baloney.

**GARLAND:** Well, here's the— If the Air Force keeps this up, they could walk into the yard and I wouldn't believe them if they said hello.

**MOYERS:** I'm sorry. Yes, sir. Very quickly.

**MAN:** Dr. Albrecht, don't you think that the— the people that live in this area, such as myself, have the guts and the ability to make this thing work if it has to be? [*applause and booing*]

**MOYERS:** The question was, doesn't Dr. Albrecht think that the people who live in Utah and Nevada have the guts to make this MX system work if it has to be in the national interest?

**ALBRECHT:** I'm not sure that's a question. I think it's really a rhetorical statement. But I don't know how one responds to it. [*applause*]

**MOYERS:** Whatever it is, the time for the televised part of this discussion is over. The people at the forum here in Salt Lake City will continue to question the panels, but we must say goodbye to those of you in the television audience. Obviously, we have not touched all the questions. We haven't even explored the big ones in the depth that they deserve. But I am grateful for the panelists for coming here and submitting to these questions and to you for participating as well. Television may quicken our interest and awareness, but it is no substitute for personal investigation and reflection. So we'll attach a bibliography to the transcript of this broadcast, including the writings and literature of many of the participants of the panel so that you can explore the issues further. We're very glad that you could join us there all across America. I'm Bill Moyers. For the Public Broadcasting Service and for our hosts in Salt Lake City, good night. [*applause*]

[*Credits — as question and answer session continues*]

**MOYERS:** And these questions may be directed at any member of the panel.

**MAN:** This question is directed towards Mr. Aaron, the president's assistant, and Undersecretary for Defense, Mr. Perry. I think one lesson that we learned from the Vietnam era that defense analysis isn't always about arms development but rather the analysis of what United States Congress will fund. Congress is presently attempting to balance the United States budget. The USDA Food Stamp program, upon which millions of United States children depend upon, will end on June 1st without immediate reauthorization. If the MX is only going to provide us with marginal additional national security, how is the President and Congress dealing with that age old perennial question, bread or bombs? [*applause*]

**MOYERS:** Bill Perry? . . . [*fade to black*]

**Transcript produced by Journal** Graphics, Inc., New York, N.Y.

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### SUBCOMMITTEE RECESS

Senator LAXALT. The subcommittee will be in recess until 10 a.m. tomorrow morning.

[Whereupon, at 4:03 p.m., Tuesday, May 6, the subcommittee was recessed to reconvene Wednesday, May 7, 1980.]

# MX MISSILE BASING MODE

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WEDNESDAY, MAY 7, 1980

U.S. Senate,
Subcommittee on Military Construction,
Committee on Appropriations,
*Washington, D.C.*

The subcommittee met at 10 a.m. in room 1114, Everett McKinley Dirksen Senate Office Building, Hon. Paul Laxalt presiding.

Present: Senators Laxalt and Garn.

## NONDEPARTMENTAL WITNESSES

### OPENING REMARKS BY SENATOR LAXALT

Senator Laxalt. Ladies and gentlemen, today represents the final session of our series of hearings on alternative basing modes for the MX missile system.

Yesterday we heard from the administration on the importance of the strategic Triad and the need for a new land-based ICBM. We also heard from the Air Force on the social, environmental, and economic impact of the MX missile system.

This morning we will hear from those who advocate alternative approaches. The first panel will include Adm. Thomas Moorer, former Chairman of the Joint Chiefs of Staff; Gen. Daniel Graham, former Director of Defense Intelligence, and Dr. William Van Cleave, former member of the SALT I delegation.

The gentlemen will discuss land-based and so-called quick-fix alternatives.

Our second panel will focus on sea-based options. We have Dr. Herbert Scoville, former Assistant Director of the Arms Control and Disarmament Agency; Dr. Sidney Drell of the Stanford Linear Accelerator Center, and Capt. John Draim who has extensive experience working on sea-based ballistic missiles for the U.S. Navy.

Senator Garn?

Senator Garn. Thank you, Senator Laxalt. I will not take any time for a formal opening statement. I am pleased to have these gentlemen here with us today and I look forward to their testimony on the alternatives to MX.

Senator Laxalt. Gentlemen, I understand you have settled among yourselves on an order of priority and you have relieved us of that troublesome chore.

General Graham will speak first and then Dr. Van Cleave and Admiral Moorer will be the cleanup hitter. In terms of time perhaps we could devote a half hour to your particular presentations and then we can take the remaining half hour for questions and answers.

General Graham, we would be delighted to hear from you. We welcome you.

## Coalition for Peace Through Strength

## STATEMENT OF LT. GEN. DANIEL O. GRAHAM, COCHAIRMAN, COALITION FOR PEACE THROUGH STRENGTH, FORMER DIRECTOR, DEFENSE INTELLIGENCE AGENCY

### GENESIS OF DEVELOPMENT AND DEPLOYMENT PROPOSALS

General **Graham**. Senator, it is a delight to be here to address this question because it is very important. But in addressing the MX question I cannot get out of my mind the genesis of the development and deployment proposals now before you and Congress.

I think it fair to say that had there been no hesitation on the part of U.S. Senators to ratify SALT II there would be no proposal from this administration for the deployment of the MX.

The MX which had for 3 years been pushed toward oblivion was retrieved and reemphasized clearly in an attempt to gain support for SALT II.

If one views the recent fate of other SALT-related administration promises to defense-minded Congressmen, that is a firm commitment to 3 percent and a 5-percent increase in the military budget, one wonders whether or not the current commitment to MX is substance or shadow.

In light of the great vigor shown by the administration to defeat any attempt by Congress to prevent an actual decrease in military spending I do not think it too cynical to doubt that any MX deployment proposal would survive long after reelection of this administration.

A discussion of the merits and flaws of the MX deployment proposals before Congress is therefore for me a bit like discussing the career opportunities of a man sentenced to the gallows.

Nevertheless a meticulous review of the MX issue is of cardinal importance because of the magnitude and cost of the program. They are such that the program would probably represent for a decade the significant response to the ominous Soviet strategic threat to the United States and its interest worldwide.

### DEPLOYMENT SCHEMES DEFECTIVE

In my view the MX deployment schemes especially the preferred administration modes are defective primarily because they reflect continued adherence to bankrupt U.S. nuclear doctrines.

Despite the sharp improvement in the counterforce capabilities of the MX missile the deployment schemes reflect a continued adherence to the doctrine of mutual assured destruction or MAD. This doctrine lies at the heart of our current strategic dilemma; indeed U.S. adherence to the MAD concept created the very vulnerabilities that appear to demand the racetrack or other mode of MX deployment.

## MAD DOCTRINE

MAD demands a U.S. capability to absorb a Soviet first strike and then respond with a second strike which results in hopefully unacceptable damage to the Soviet society. It thus causes an inexorable emphasis on offensive nuclear systems and a near total disregard of strategic defense.

The punitive requirement for offensive forces under the mutual assured destruction concept logically drives targeting toward countervalue or city busting and away from counterforce or damage limiting systems.

We have clung and many still cling stubbornly to the MAD doctrine because it has been fundamental to the U.S. approach to strategic arms limitation, and because it has been assumed to be the cheapest answer to maintaining a nuclear equilibrium or the so-called balance of terror.

As a result we have almost totally destroyed our strategic defenses both active and civil defense and we have concentrated our offensive capabilities on the proliferating of lesser yield warheads of insufficient accuracy for attack on military targets.

## RESPONSE TO SOVIET STRATEGIC DEFENSE POSTURE

The Soviets meanwhile having dismissed the MAD idea with contempt created effective strategic defenses and a credible counterforce threat in offensive systems.

We now propose belatedly to respond to that threat with MX deployed in modes still dictated by mutual assured destruction.

The basic idea of MX with multiple launch points is to provide more nuclear offensive capability deployed in such a way as to absorb a much larger Soviet first strike than can our present missile systems. The system is designed to fit the constraints of SALT I, SALT II and hoped for SALT III. These completed or contemplated treaties are also dependent upon the supposed viability of the mutual assured destruction doctrine.

The fact that the MX system, the missile itself has good counterforce capabilities at once presents an anomaly and exposes a basic dichotomy in U.S. strategic thinking. It is an anomaly because the deployment mode for MX is designed to soak up the effects of the very Soviet weapon systems that should be the prime target for MX in a counterforce role.

It exposes the dichotomy of thought between U.S. political leadership beginning with Mr. Robert McNamara and the professional military. The Chairman of the Joint Chiefs of Staff in his testimony before the Senate Foreign Relations Committee concerning SALT II last year declared that despite adherence to the MAD doctrine elsewhere in Washington he rejected it as a dangerous idea.

What we see in MX is a counterforce weapon developed on the basis of the military rejection of mutual assured destruction being deployed in a mode dictated by mutual assured destruction doctrines.

I am convinced that if the Senate were to ask any group of military professionals freed from the constraints of the mutual assured destruction doctrine how best to use some $35 to $60 billion to respond to the threat to our deterrent posed by the Soviets they would never respond with the current proposals for MX.

### STATE OF U.S. DETERRENCE

Such proposals, linear or racetack; vertical or horizontal; scattered or concentrated in Utah and Nevada would be discarded. Even the most ardent enthusiasts for offensive forces over defensive would discard the current plans because the U.S. deterrent would not be significantly enhanced until the late 1980's and perhaps even later. With the period of maximum danger arising even now the 10-year lag in response is unacceptable.

In my view the most effective response to the current strategic imbalance is in a technological end run rather than an attempt to match the Soviet mass with mass.

The most promising area for such technological leap frog of the Soviets is in a combination of superior U.S. technology and anti-ballistic missile defense technology.

According to technical experts I have consulted a space borne defense system can be developed and deployed much faster than the MX in proposed modes. Such a system would frustrate the Soviet threat to our deterrent and pose for them an entirely new dimension in the strategic balance.

The essence of deterrence is uncertainty of results in the mind of any aggessor. Uncertainty can be increased by multiple aim points to be sure. The problem for an attacker remains the solution of a static equation.

Active defense is a more reliable adjunct to deterrence. It makes the Soviet planner try to solve a dynamic equation in which their attacking weapons may or may not reach their intended targets.

I believe that the long range strategic interests of the United States as well as the shorter term requirements to redress a dangerous imbalance of strategic nuclear power are better served by investment in a high technology defense than in the MX in its proposed deployment modes.

### TIMEFRAME FOR ADDING SUFFICIENT MX MISSILES

I have consulted with some of the captains of high technology industry and with their technological advisors and have extracted these basic estimates. Given an immediate decision to go ahead, given full funding and no political restraints, it will take roughly 10 years to add to our deterrent 200 MX missiles in a multiple aim point deployment mode.

It will take 7 years to add to our deterrent 100 B–1 bombers. It would take 3 to 4 years to add to our deterrent a significant space borne missile intercept system.

I cannot vouch for the accuracy of the 3- to 4-year estimate for a spaceborne defense but I submit that even should such a defense take as long to deploy and be as expensive as MX it is the way to go. It exploits the major technological advantages of the United States over the U.S.S.R. to the maximum and repairs the enormous damage done to our strategic position resulting from many years of total neglect of strategic defense.

Thank you.

PREPARED STATEMENT

Senator LAXALT. Thank you, General Graham. We will place your prepared statement in the record at this point.

[The statement follows:]

### PREPARED STATEMENT OF LT. GEN. DANIEL O. GRAHAM

In my view, the MX deployment schemes, especially the preferred Administration modes, are defective primarily because they reflect continued adherence to bankrupt United States nuclear doctrines. Despite the sharp improvement in the counterforce capabilities of the MX missile, the deployment schemes reflect a continued adherence to the doctrine of Mutual Assured Destruction or MAD. This doctrine lies at the heart of our current strategic dilemma; indeed U.S. adherence to the MAD concept created the very vulnerabilities that appear to demand the racetrack mode MX deployment.

MAD demands a U.S. capability to absorb a Soviet first strike and then respond with a second strike which results in unacceptable damage to Soviet society. It thus causes an inexorable emphasis on offensive nuclear systems and a near total disregard of strategic defense. Further, the punitive requirement for offensive forces under MAD logically drives targetting toward countervalue (city-busting) and away from counterforce or damage limiting systems.

We have clung—and many still cling—stubbornly to the MAD doctrine because it has been fundamental to the U.S. approach to Strategic Arms limitation and because it has been assumed to be the cheapest answer to maintaining a nuclear equilibrium or "balance of terror." As a result we have almost totally destroyed our strategic defenses, both active and civil defense, and we have concentrated our offensive capabilities on proliferating lesser yield warheads of insufficient accuracy for attack on military targets. The Soviets, meanwhile, having dismissed the MAD idea with contempt, created effective strategic defenses and a credible counterforce threat in offensive systems.

We now propose belatedly to respond to that threat with MX deployed in modes still dictated by MAD.

The basic idea of MX with multiple launch points is to provide more nuclear offensive capability deployed in such a way as to absorb a much larger Soviet first strike than can our present missile systems. Further the system is designed to fit the constraints of SALT I, SALT II and hoped-for SALT III—these completed or contemplated treaties also dependent upon the supposed viability of the MAD doctrine.

The fact that the MX system has good counterforce capabilities at once presents an anomaly and exposes a basic dichotomy in U.S. strategic thinking. It is an anomaly because the deployment mode for MX is designed to soak up the effects of the very weapon systems that should be the prime targets for MX in a counterforce role. It exposes the dichotomy of thought between U.S. political leadership (beginning with Robert McNamara) and the professional military. The Chairman of the Joint Chiefs in his testimony before the Senate Foreign Affairs Committee last year declared that despite adherence to the MAD doctrine elsewhere in Washington he rejected it as a dangerous idea. What we see in MX is a counterforce weapon developed on the basis of the military rejection of MAD being deployed in a mode dictated by MAD.

I am convinced that if the Senate were to ask any group of military professionals freed from the constraints of the MAD doctrine how best to use $35 to $60 billion to respond to the threat to our deterrent posed by the Soviets, they would never respond with the current proposals for the MX. Such proposals—linear or racetrack, vertical or horizontal, scattered or concentrated in Utah-Nevada—would be discarded. Even the most ardent enthusiasts for offensive forces over defense would discard the current plans because the U.S. deterrent would not be significantly enhanced until the late 1980's—perhaps even later. With the period of maximum danger arising even now, the 10-year lag in response is unacceptable.

In my view, the most effective response to the current strategic imbalance is in a technological end run rather than in an attempt to match mass with mass. The most promising area for such a technological leap-frog of the Soviets is in a combination of superior U.S. space technology and anti-ballistic missile defense technology. According to technical experts I have consulted, a space-borne defense system can be developed and deployed much faster than the MX in proposed modes. Such a system would frustrate the Soviet threat to our deterrent and pose for them an entirely new dimension in the strategic balance.

The essence of deterrence is uncertainty of results in the mind of the aggressor. Uncertainty can be increased by multiple aim points, to be sure, but the problem for the attacker remains the solution of a static equation. Active defense is a more reliable adjunct to deterrence, however. It makes the Soviet planner try to solve a dynamic equation in which their attacking weapons may or may not reach their intended targets.

I believe that the long range strategic interests of the United States as well as the shorter term requirements to redress a dangerous imbalance of strategic nuclear power are better served by investment in a high technology defense than in the MX in its proposed deployment modes.

It is time we replaced programs built upon the Mutual Assured Destruction doctrine and adopted Mutual Assured Survival.

Thank you.

## DEFENSE AND STRATEGIC STUDIES, UNIVERSITY OF SOUTHERN CALIFORNIA

## STATEMENT OF WILLIAM R. VAN CLEAVE, DIRECTOR, DEFENSE AND STRATEGIC STUDIES, UNIVERSITY OF SOUTHERN CALIFORNIA

### PREPARED STATEMENT

Senator LAXALT. Dr. Van Cleave?

Dr. VAN CLEAVE. Thank you. Let me build a little bit upon General Graham's statement. I have submitted a lengthier statement for the record which I will merely summarize in the interest of time.

Senator LAXALT. That will be acceptable, Dr. Van Cleave. We will insert your prepared statement in the record at this point.

[The statement follows:]

# Prepared Statement of Professor William R. Van Cleave

## DIRECTOR, DEFENSE AND STRATEGIC STUDIES, UNIVERSITY OF SOUTHERN CALIFORNIA

The principal purpose of this hearing is to examine the MX program and to explore alternatives that might reduce the impending vulnerability of our ICBM force in a timely and effective fashion. The problems facing the ICBM force in the immediate future are clear and officially acknowledged; they deserve particular and even priority attention. Yet, we should at the same time keep in mind that, however pressing the ICBM problems, they are part of a general trend toward strategic inferiority, which is the legacy of a decade of SALT. During this decade the Soviets have outspent us on strategic force capabilities by over $150 billion and they continue to do so at a rate at least 3.3 times our own. Because of this all elements of our strategic deterrent urgently need improvement.

This general observation is to make two points: first, the dangerously adverse trends in the overall strategic balance make the resolution of ICBM vulnerability an even more urgent requirement. Secretary Brown seems fond of saying that ICBM vulnerability is not the same as vulnerability of our strategic deterrent, thereby implying that we can take a more leisurely approach to ICBM vulnerability inasmuch as all other components of the deterrent are in good shape. He told this subcommittee just yesterday that "Even though Minuteman will become vulnerable in the early 1980s, the triad permits continued high confidence in the capability of our strategic deterrent forces, allowing us time to restore the survivability of our ICBM force in a rational manner." If a "rational manner" means a leisurely manner, or the acceptability of long lead times, this is not true. Brown's comment ignores the essential requirement of crisis stability, that we do not allow any major segment of our strategic forces to become vulnerable. It also ignores vulnerabilities and limitations that will exist in our other strategic forces in the 1980s. The TRIAD in the 1980s will not be healthy enough to permit acceptance of Minuteman vulnerability during that period. Indeed, my second point is that focusing on ICBM vulnerability should not divert effort away from modernizing and fixing problems in other strategic force components.

The major problem is simply that we are not proceeding with sufficient vigor and dispatch. The current strategic nuclear force programs, as described in the Department of Defense FY 1981 budget request and five year defense plan, are mostly too little or too late to meet strategic problems and reverse strategic trends in a timely manner. A serious disconnect continues to exist between the developing threat and the ability of U.S. programs to keep pace with it.

Even if we rely on analyses provided by DOD--which I believe to understate our problems and to be overly optimistic about the timing and effectiveness of current programs--we will see a serious trough of U.S. strategic inferiority facing us through most of the 1980s. This loss of "essential equivalence" is particularly threatening because it will be characterized by dangerous vulnerabilities in major components of our deterrent forces and by a substantial disparity in the ability to threaten--or to counter threats of--nuclear war. There is justifiable concern that if we allow this to occur it would present a "window of opportunity" to the Soviets where military advantage might be turned into political and economic gains detrimental to our interests.

Administration officials have acknowledged that Soviet strategic capabilities are surpassing those of the United States more rapidly than anticipated; yet, our own strategic force planning proceeds at a rather leisurely business-as-usual pace. In the FY 1980 DOD Report Secretary Brown stated that "our most serious concerns, which we need to act now to meet, are about the period of the early-to-mid 1980's." At the same time General Jones pointed out with apparent agreement that many now believe that "regardless of U.S. actions, Soviet strategic capability will continue to increase relative to that of the United States through the mid-1980's."

The FY 1981 defense plan, despite the President's professed awakening to Soviet objectives during the past year, does not change the situation. It still lacks a sense of timing or urgency in meeting the threat. At the same time, the FY 1981 report of the Joint Chiefs of Staff acknowledges that we face "a period of particular risk in the early 1980's. . . before U.S. initiatives now programmed can take effect." General Jones has reported that the Soviets have "at least strategic equality" today; that their relative momentum will give them an advantage in most of the major strategic force comparisons in the early 1980s; and that "this progressive shift in the strategic balance will continue into the latter part of the 1980's."

Is there nothing that can be done to avoid this? Current programs, supported by official statements, imply that we can do very little to change the situation until the late 1980s.

I do not agree. There are options available to strengthen our strategic forces more rapidly than now planned, and to reduce significantly the disadvantages and risks we now face in the short-to-mid term. Mostly, this is a matter of determination and decision. The range of options has been discussed elsewhere, either by myself with reference to the Strategic Alternatives Team, or by others.* I would be happy to discuss any of these other SNF options with the Committee, and would encourage it to explore them. For now let me turn to the particular topic at hand and see how these introductory comments apply to the issue of ICBM vulnerability.

## THE MX PROGRAM, AND A COMPLEMENTARY OPTION

The MX debate, as we all know, is generating a good deal of emotion, political pressure, and even in-fighting within the defense community. Given the complexities involved and what is at stake, or seems to many to be at stake, this is only natural. I share the Air Force concern that the net consequence of this debate may be to weaken and further delay an appropriate response. I do not want that to happen, but I am not persuaded that the Administration's approach is the best possible. There are certainly strong arguments for the MX, but there are also legitimate concerns about the proposed program that deserve to be addressed. Above all there are important questions concerning its timeliness and viability.

Even if the "loading-dock" system were as successful operationally as the Air Force maintains, the plain fact is that the proposed program will not meet the threat as it arises or for several years thereafter. Therefore, it does not stand the critical test of timeliness, and I believe that it faces severe political and environmental obstacles that may prove to be more time-consuming than anticipated. The dilemma for those who recognize the need for more survivable ICBM basing is time. If we had time to continue working out the optimum system, that would be one thing, but we have already procrastinated far too long and we must act now to achieve the most timely solution available. We need to seek a compromise solution that meets both the requirements of national security and the justifiable concerns about the proposed system, its timeliness, its viability, and its local impact.

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* See, for example, William R. Van Cleave and W. Scott Thompson, eds., Strategic Options for the Early Eighties: What Can Be Done?, National Strategy Information Center, 1979; my March 14, 1980, statement to the House Armed Services Committee; and the chapter on strategic forces in a forthcoming book authored by F. Hoeber, W. Schneider, N. Polmar and R. Bissell, Arms, Men, and Military Budgets: Issues for FY 1981, National Strategy Information Center.

The ICBM vulnerability problem has been anticipated for some time. Harold Brown stated last year that "we were able to infer that, as early as 1962-1963, the Soviets had a policy of building forces for preemptive attack of U.S. ICBMs." Over fifteen years ago, concerns that our fixed land-based ICBM launchers would become unacceptably vulnerable in the future prompted technical studies of survivability options. In 1969, the President deemed it necessary to begin a major ABM program to defend the threatened ICBM launchers, a program that was derailed by SALT. The Ford Administration saw the need to begin rebasing ICBMs in the early 1980s, even though its official projections of the Soviet threat--projections presciently challenged by the 1976 "B Team"--were less than what the Soviets subsequently accomplished.

Despite this there has been a continued disparity between the Soviet effort to place our ICBMs in jeopardy and the U.S. effort to maintain their survivability. The U.S. failure to keep pace with the Soviet effort is, first, a direct consequence of SALT and of SALT expectations, which have clearly not borne fruit; and, second, the result of indecisiveness and reluctance on the part of this Administration to make the necessary effort. Despite its present support of MX, the Administration's approach to the problem has not been one to instill confidence in the seriousness of its intent, or, for that matter, in its selection of a particular response to the problem. In the past three years, the Administration has demonstrated inconstancy by favoring first one option and then another, its choices heavily influenced by SALT perceptions. In the last two years, the Administration has variably favored the trench system, a hybrid modification, vertical shelters, air mobility, the zippered trench, the race track with full mobility, the loading-dock race track with restricted mobility; and now I read in the newspaper that yesterday it scratched the race track in favor of "linear" deployment. The old saying in certain parts of the country is, "If you don't like the weather, stick around, it will soon change." The same seems to be true with the Administration's MX deployment plans.

Largely because of this a credibility problem does exist. Many feel that the current MX deployment plan is contrived, mostly to meet White House SALT concerns. Only a year ago, the Air Force - speaking for the Administration - strongly favored the vertical shelter mode. General Allen testified that after some 30 alternative basing modes had been thoroughly investigated, subjected to an intense and exhaustive review, and then re-evaluated by the Air Force and the Defense Science Board, the vertical MPS remained the "best means to assure ICBM survivability." In February, General Allen changed this position, referring to "high level deliberations" that allegedly raised questions about survivability (after a ten year study of 30 alternatives!) and verifiability. The vertical system is verifiable, if that is such a concern. In my own view, the movement away from vertical shelters had more to do with SALT ambiguities concerning what constitutes a "launcher," which the Administration wished to avoid.

Whatever reason for the continued changes -- whether indecisiveness, SALT, new developments, or what Harold Brown terms "engineering refinements" -- they do seem to demonstrate that the system has not yet settled, and that further modification is likely. In that case, it may not be wise to lock ourselves into one concept at the expense of another, _if_ there is a reasonable alternative available. Let me address that.

The currently planned system is more complex and admittedly more expensive than the vertical system preferred a year ago. I have some concern that the mobility feature lacks a strong rationale and may compromise concealment, or preservation of location uncertainty (PLU); but let us assume that this concern could be resolved. With continuing refinement, the proposed system should be technically and operationally viable. I do not challenge its credibility. It will simply take too long to deploy to meet the threat when we should be able to meet it. It is a 1990s solution for a 1980s problem.

A separate question is whether the system is also politically viable. I am less comfortable about this. It is not only that political opposition to it seems to be mounting, but that it is doubtful to me that the present Administration, if re-elected, would continue to give the system the necessary support. With only lukewarm support, the system is likely to erode in the face of political pressures, budgetary squeezes, and threat uncertainties. Such long lead time programs are usually the more vulnerable in any case.

Because of these considerations, it seems to me prudent to cultivate an option. If this system were the only, or clearly the best, alternative for ICBM survivability, I would say that we should support it and work to accelerate its completion. But that is not the case.

Three hypothetical alternatives should be rejected; _i.e._, do nothing (relying perhaps on launch on warning), continue to study alternatives (as if we had more time), or supplant the land-based force with some sea-based option. They are irrelevant to the problem and, I believe, dangerous.

There is, however, a realistic alternative that might well _complement_ the longer term MX program by meeting the nearer term threat. This is to redeploy existing Minuteman III missiles in vertical MPS in existing deployment areas. The basic facilities already exist, and community interface problems should be more manageable inasmuch as these communities have been accustomed to Minuteman bases and launchers for twenty years.

The Minuteman III, if survivable, is a capable missile. It can readily be modified and canisterized for deployment in such a multiple shelter mode. A year ago General Allen told Congress that "modifying a Minuteman III for deployment in vertical shelters requires only about two years." The Strategic Alternatives Team has estimated that with some $1 billion R&D, it could be done in one year, after which a few hundred per year (e.g., 365) could be modified, canisterized, and deployed. At the rate at which we initially deployed Minuteman, about one per day, the entire stockpile of 700 Minuteman III could be modified and deployed in about three years' total.

General Allen also noted that in the case of Minuteman III redeployment the pacing would be determined by development of the basing mode. Studies have shown that austere vertical shelters, suitable for this deployment scheme, could be constructed -- after perhaps a year's preparation -- at the rate of several hundred per year, up to 2500 or more. This admittedly does not take into account the time necessary for land acquisition. Purchasing from private ownership several hundred one acre plots (in areas already containing such plots) will take some time, but it should not cause lengthy delay if pursued correctly.

The precise costs* and time for deployment of this system are certainly disputable, but I believe that it approaches certainty that -- if pursued with some urgency -- as many as 700 Minuteman III might be redeployed be 1985, or well before the likely IOC of the first MX.

Testifying before the Senate Foreign Relations Committee just last September, Dr. Michael May, who had chaired the Defense Science Board panel on land-based ICBM survivability, addressed this option: "A quicker, cheaper and more flexible way to preserve the survivability of the U.S. ICBM force (at least of half of it), in my opinion, would be to redeploy the present Minuteman missiles, with some modifications, using the present Minuteman bases and public roadways and some 10,000 places in which the missiles could be hidden. Such deployment, if pursued with some urgency, should shave about four years and 15 billion dollars from the proposed MX race track deployment. It would also be a relatively flexible way to go."

The major arguments against this approach (setting aside for the moment SALT objections that remain unclear) are, first, that the costs and time required for this system are not much different from those for the planned MX. Unless we continue to defer serious work on the option, I do not believe that to be the case, as I have indicated. The second major argument is that proceeding with this option, even in tandem with the MX program, will only further delay MX; and that advocacy of it may well jeopardize the entire MX program by diverting funding and by strengthening opposition.

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* An Air Force analysis presented in 1978 indicated that 550 Minuteman III could be deployed in some 12,000 vertical shelters for $25 billion.

Unfortunately, I believe there to be some merit to this argument. It places me in a difficult position since my objective is also a more survivable and capable ICBM force, and is not merely to oppose or delay the MX missile program. On the other hand, MX is already delayed and is likely to become more so, which to me only strengthens the case for a "quick fix" to the vulnerability problem.

My recommendation is to proceed this year with both options, redeployed Minuteman III and the proposed MX program. Either will work; we may need some combination of both. As I recently stated to the House Armed Services Committee:

"In my view, then, the money requested by the Administration for the overall ICBM modernization program should be authorized; indeed, it should be increased. I would like to see the MX missile development proceed as planned, but I would also like to see a serious R&D effort this year devoted to canisterizing and upgrading Minuteman III and the beginning of a major concurrent development effort for a new, smaller ICBM (which might lend itself more readily to concealment and mobility measures). In order to hedge against a different political decision on basing (hardly unlikely given the number of changes over the past year), I believe that R&D for this year should go roughly equally into the presently planned system and into keeping the vertical MPS system viable, while reducing the lead time for both. This, I believe, would provide a more prudent hedge than locking ourselves into the current system alone, while ignoring entirely the interim possibility of rebasing Minuteman III in vertical MPS around existing deployment sites."

The Air Force may be quite correct that in the long run, with plenty of time, the proposed MX system in Utah and Nevada would be preferable; but we do not have that leisure and there are many who doubt the Air Force anyway. My personal preference would be to redirect program emphasis to the suggested redeployment of Minuteman, giving it first priority, even at the expense of MX slippage; and, for that matter, to do so by redirecting FY 1980 money rather than awaiting FY 1981 funding. There is no reason why the MX missile could not be phased into such a system as the missile becomes available. But as a compromise, it makes sense to proceed with both options, particularly in a presidential election year. The arguments I see for doing so are the following:

(1) If approached with some urgency, the short-term threat problem can be better met while we are working on the longer-range problem.

Uncertainties in the long-range threat create uncertainties in the longer-range system, but ought not to prevent us from meeting the near and clearly identifiable threat, particularly when the vertical MPS option exhibits good flexibility in meeting expanded threats (through additional shelters and/or through an ABM overlay, as necessary).

(2) The Minuteman III option provides insurance against loss of support for the MX deployment plan.

(3) Proceeding with both creates an option for some combined deployment split between the two, which might turn out to allow some reduction in present MX deployment plans for Utah and Nevada. This could well relieve concerns and lessen opposition in those areas.

Without any loss of time in meeting the vulnerability problem, decisions could be deferred concerning the ultimate mix of Minuteman and MX missiles in vertical or horizontal shelters, and by deployment area.

(4) Finally, proceeding with both and not locking into one alternative this year provides a better option for 1981, pending the outcome of this year's presidential election.

### SALT AT FAULT FOR DECADE OF STRATEGIC INFERIORITY

Senator LAXALT. You may proceed, Dr. Van Cleave.

Dr. VAN CLEAVE. I would like to preface my remarks on the MX by pointing out while the problems facing the ICBM force in the immediate future are clear and officially acknowledged and deserve particular and priority attention, we should at the same time keep in mind that however pressing the ICBM problem as General Graham pointed out, they are only part of a general trend toward strategic inferiority which is the legacy of a decade of SALT.

During this decade the Soviets have outspent us on strategic forces by over $150 billion and they continue to do so at a rate at least 3.3 times our own. Because of this all elements of our strategic deterrent urgently need improvement.

I make this general observation in order to make two other points. First the dangerously adverse trends in the overall balance make the resolution of ICBM vulnerability an even more urgent requirement in my view.

Secretary Brown is fond of saying that ICBM vulnerability is not the same as vulnerability of our strategic deterrent thereby implying I believe that we can take a more leisurely approach to ICBM vulnerability inasmuch as all the other elements of the deterrent are in good shape. This is not true.

Brown's comment ignores the essential requirement of crisis stability that we do not allow any major segment of our strategic forces to become vulnerable and it also ignores vulnerabilities and limitations that will exist in our other strategic capabilities in the 1980's.

### MODERNIZATION OF OTHER STRATEGIC FORCE COMPONENTS

The Triad coupled with our lack of strategic defenses in the 1980's will not be healthy enough to permit acceptance of Minuteman vulnerability during that period of time. Indeed, my second point is focusing on the ICBM vulnerability problem ought not divert attention away from modernizing and fixing problems in other Strategic Force components.

### DEBATE ON MX BASING

Turning to the question of the land-based-missile option, the MX program, the debate as we all know is generating already a good deal of emotion; political pressure and even infighting within the defense community. Given the complexities involved and what is at stake this is only natural.

I find myself sharing somewhat the Air Force concern that the net consequence of the debate could only be to weaken or further delay an appropriate response. I certainly do not want this to happen. I am not persuaded that the administration's approach is the best possible.

### TIMELINESS A FACTOR IN MX PROGRAM

There are strong arguments for MX but there are also legitimate concerns about the proposed program that deserve to be addressed. Above all there are important questions concerning its timeliness.

The dilemma for those who recognize the need for more survivable ICBM basing is simply time. The plain fact is the proposed program even if it were successful operationally, as the Air Force maintains, it would not meet the threat as it arises or for several years thereafter.

We have simply waited too long.

I also agree with General Graham that despite its present support of MX the administration's approach to the problem has not been one to instill confidence in the seriousness of its intent or, for that matter, in its selection of a particular response to the problem.

### INCONSISTENCY IN ADMINISTRATION'S DECISIONS

In the past 3 years the administration has demonstrated inconsistency by favoring first one option and then another. Its choices were heavily influenced by SALT considerations. In the last 2 years the administration has variably favored the trench; the hybrid; vertical shelters; air mobility; a zippered trench; a racetrack with full mobility; the loading dock racetrack with restricted mobility. And now I read in the paper that yesterday it scratched the loading dock in favor of the linear deployment.

### CREDIBILITY PROBLEM IN DECISIONMAKING

Largely because of all of this a credibility problem does exist. Only a year ago the Air Force speaking for the administration strongly favored the vertical shelter mode. General Allen testified that after some 30 alternative basing modes had been thoroughly investigated and subjected to an intense and exhaustive review and then reevaluated by the Air Force and the Defense Science Board, the vertical MPS emerged as by far the "best means to assure ICBM survivability."

In February General Allen changes this assertion referring to "high-level deliberations" that allegedly raise questions about survivability despite this 10-year study of 30 alternatives and about verifiability.

### VERTICAL SYSTEM MODIFICATIONS

The vertical system is verifiable if that is a concern. In my own view the movement away from vertical shelters had more to do with SALT ambiguities concerning what constitutes a "launcher" which the administration wished to avoid and is yet another clear case of SALT leading us in the wrong direction.

Whatever reasons for the continued changes they do seem to demonstrate that the system has not yet settled and that further modification is likely. In that case it would not be wise to lock ourselves into one concept at the expense of another if there is a reasonable alternative available. Let me address that.

The currently planned system is more complex and expensive than the system preferred a year ago. I have some concern that the mobility feature lacks a strong rationale and may compromise concealment.

Let us assume this concern could be resolved. With continuing refinement the proposed system should be technically and operationally viable. Therefore I do not challenge its credibility. It will simply take too long to deploy to meet the threat when we should be able to meet it,

It is a 1990 solution for a 1980's problem.

### POLITICAL VIABILITY OF SYSTEM

A separate question is whether the system is also politically viable. I am less comfortable about that. It is not only that political opposition to it seems to be mounting but that it is doubtful to me that the present administration if reelected would continue to give the system the support necessary.

There is because of these considerations a need to be prudent and turn to cultivating another option and another option which could well complement a longer term program by meeting the nearer term threat does, in my opinion, exist.

This is to redeploy existing Minuteman III missiles in vertical multiple shelters in existing deployment areas.

The basic facilities already exist and community interface problems should be more manageable inasmuch as these communities have been accustomed to Minuteman bases and launchers for 20 years.

### SURVIVABILITY OF MINUTEMAN III

The Minuteman III if survivable is a capable missile. It can readily be modified and canisterized for deployment in such a multiple shelter mode.

A year ago General Allen told Congress "modifying a Minuteman III for deployment in vertical shelters requires only about 2 years."

The Strategic Alternatives Team has estimated that with some $1 billion R. & D. or less it could be done in 1 year after which a few hundred per year could be modified, canisterized, and deployed.

At the rate at which we initially deployed Minuteman from scratch, about one per day, the entire stockpile of 700 Minuteman III missiles could be modified and deployed in about 3 years total time.

General Allen also noted that in the case of Minuteman III redeployment the pacing would be determined by the basing mode. Studies have shown that austere vertical shelters suitable for this deployment scheme could be constructed after perhaps a year's preparation and learning at the rate of several hundred per year up to 2,500 or more.

### LAND ACQUISITION FOR MINUTEMAN III SILOS

This admittedly does not take into account the time necessary for land acquisition. Purchasing from private ownership several hundred 1-acre plots in areas already containing such plots will take some time but it should not cause lengthy delay if pursued correctly.

The precise costs and time for this deployment are certainly disputable. I believe it approaches certainty that if pursued with some urgency as many as 700 Minuteman III might be redeployed before 1985 or well before the likely IOC of the first MX missile.

This was testified to just last September by Dr. Michael May who had chaired the Defense Science Board panel on land-based ICBM survivability up to that point of time. He said:

> A quicker cheaper and more flexible way to preserve the survivability of the U.S. ICBM force in my opinion would be to redeploy the present Minuteman missiles using the present Minuteman bases and public roadways and some and some 10,000 shelters.

### ARGUMENTS AGAINST MINUTEMAN III USE

The major arguments against this approach as I see them setting aside for the moment SALT objections which remain unclear are first that the costs and the time required for this system are not really much different from those for the planned MX. Unless we continue to defer serious work on the option I do not believe that to be the case as I have indicated.

The second major argument is that proceeding with this option even in tandem with the MX program will only further delay MX and that advocacy of it may well jeopardize the entire MX program by diverting funding and by strengthening opposition.

Unfortunately I believe there to be some merit in that argument. It places me in a difficult position since my objective is also a more survivable and capable ICBM force and is not merely to oppose or delay the MX missile program.

On the other hand MX is already delayed and is likely to become more so which to me only strengthens the case for a "quick fix" to the vulnerability problem.

### RECOMMENDATION TO UTILIZE BOTH SYSTEMS

My recommendation is to proceed this year with both options, redeployed Minuteman III and the proposed MX program. Either will work. We may need some combination of both.

The money requested by the administration for the overall ICBM modernization should be authorized and even increased. The MX missile development may proceed as planned but I would also like to see a serious R. & D. effort this year devoted to canisterizing and upgrading Minuteman III.

A reasonable compromise would be to put R. & D. this year roughly equally into the presently planned system and into keeping the vertical system viable while reducing the lead times for both.

Having said that my personal preference would still be to redirect program emphasis to the suggested redeployment of Minuteman giving it first priority even at the expense of some MX slippage and for that matter to do so by redirecting fiscal year 1980 money rather than awaiting fiscal year 1981 funding.

There is no reason why the MX missile could not be phased into such a system as the missile becomes available. As a compromise it makes sense to proceed with both options particularly in a Presidential election year.

To summarize, the arguments I see for doing so are the following: if approached with some urgency, the short-term threat problem can be better met while we are working on the longer range problem.

The Minuteman III option provides insurance against loss of support for the MX deployment plan.

Proceeding with both creates an option for some combined deployment split between the two which might turn out to allow some reduction in present MX deployment plans for Utah and Nevada. This could well relieve local concerns and lessen opposition in those areas.

Without any loss of time in meeting the vulnerability problem decisions could be deferred concerning the ultimate mix of Minuteman and MX missiles in vertical or horizontal shelters and by deployment area.

Proceeding with both and not locking into one alternative this year provides a better option for 1981 pending the outcome of this year's Presidential election.

Thank you.

Senator LAXALT. Thank you, Doctor. Admiral Moorer?

## FORMER CHAIRMAN, JOINT CHIEFS OF STAFF

## STATEMENT OF ADMIRAL THOMAS MOORER, FORMER CHAIRMAN, JOINT CHIEFS OF STAFF

### IMPROVEMENT OF LAUNCHING SYSTEMS

Admiral MOORER. Mr. Chairman, in general I concur with the broad statements made by the gentlemen on my right and left.

I would like to inject two or three other comments including a suggestion for another option.

In the first place let me say I certainly do not intend by any statement that I make to prevent or slow the development of our strategic forces. I think it is quite true as has been said this morning that we have neglected these forces to a marked degree, while the Soviets have been surging ahead with a rather spectacular momentum.

As far as the MX is concerned, as I recall when I was on active duty the original concept was to do what we called, "stuff the MX into the Minuteman launchers." Dr. Van Cleave has in effect covered this idea of making a perhaps better missile than the Minuteman but retain essentially the same launching mode and with more launchers.

I was appalled to read in the DOD report about MX that the MX basing mode was being deliberately designed so that the Soviets would not have any difficulty in verifying it, and our compliance in accordance with the SALT II provisions.

### SEA-BASED OPTION

I think this morning I would like to talk about another option which you will hear about in the next hour. That is the sea-based option.

I have had concern for some time about the fact that we deploy a major part of our Triad in the center of the United States. This means that the Soviets when they fire or if they attempt to disarm our ICBM's will not only be firing at the ICBM's themselves but will create a fallout of major proportions which due to the prevailing winds will then drift back over the Chicago-Boston-Washington triangle.

The idea that we can discern by one means or another whether the Soviets intend to attack civilians and cities, or whether they intend to attack military forces and in this case the missiles, I think is one that cannot be determined.

The point is the flow of fallout is always to the east, I think it is significant that the Soviets have all their missiles in the extreme eastern part of their country so that should we ever make the decision to attack their missiles the fallout will affect the Chinese and the Japanese but not the Soviets.

## SEA-LAUNCHED MISSILES

That being the case what other options are available? We have discussed for some time the business of launching missiles from the sea simply by using a flotation device and this has been done successfully with small missiles way back in the 1960's.

Unfortunately SALT II is ambiguous with respect to launchers. There have been indications that the Soviets are aware of this technique and are working on it. That being the case the sea provides an infinite number of launchers, rather than a finite number of launchers that can be verified.

Lacking a single target area in the Western States for the MX, you would have a situation where the fallout would not in any way affect the civilians or citizens of the United States.

I feel it is a scientific fact that it is impossible to target a mobile force at sea on schedule. The ICBM's that are fixed in the center of the United States can be targeted 10 years in advance because they are not going to move. They are going to be there within specific geographical limits.

On the other hand it takes what I would call real time intelligence to target any moving target including the space capabilities General Graham spoke about. Consequently if the Soviets were to decide to make what is called a first strike, obviously they would have to set up their fire control systems at that very moment and consequently since they would know they could not be 100 percent successful, or even have a high percentage of hits, that in itself would add to the deterrent.

Furthermore I am confident that by basing these missiles on ships or any mobile floating carrier that it could be made into an effective force.

We are a maritime power. The Soviets on the other hand are a land power. Their Navy is heavily restricted by geography. We have unrestricted access to both the Atlantic and Pacific Oceans. We have long coastlines. We have a capability of doing this.

There are those who say the missile will not be accurate and it is technically infeasible, and so on. But there have been significant advances in missile guidance over the last 10 years while we were more or less dormant in experimenting with sea-based options, and I am confident that American technology can provide what it takes to deploy these forces at sea.

What I am saying in a nutshell is that I think so far as the MX is concerned we have enough missiles in the center of the United States already and we should focus our effort on other modes of deployment.

## SHORT-TERM PROBLEM FOR MX DEPLOYMENT IS ACUTE

At the same time I agree fully with Dr. Van Cleave that we have two problems, a short-term problem and a long-term problem. These should be examined very carefully. I agree we also cannot debate this question forever because the short-term problem is acute.

I do not think it is wise for the United States to continue to focus more and more missiles in the very center of our populated area so the populated area would be in jeopardy. I believe if the Soviets were to attack our missiles that the only safe area in the United States would be on the west coast, that is to the west of where we are putting these missiles.

With that I will conclude, Mr. Chairman. I think what has been said by General Graham and Dr. Van Cleave in particular is very important and should be fully considered before we launch forth on this ever changing launching concept. The proposed DOD plan for MX basing is going to affect the environment and require inordinate amounts of cement. It is going to affect the water problem in the areas of Utah and Nevada. At the same time I want to emphasize by making these comments I am not in any sense trying to prolong the debate to the point where we do nothing.

Thank you, Mr. Chairman.

Senator LAXALT. Thank you very much, Admiral. I gather the panel does not seriously dispute if at all the fact that we have a very serious problem in connection with the vulnerability of our land based ICBM's.

Admiral MOORER. That is correct, sir.

Senator LAXALT. Certainly the panel does not dispute that something has to be done and quickly. I guess basically we are talking about options.

Admiral MOORER. Exactly.

### USE OF SPACE ABM SYSTEM

Senator LAXALT. General Graham, if I understand the thrust of your testimony as you phrased it you would employ a technological end run and you would go to space ABM. Is that it?

General GRAHAM. That is correct. The mystery of why we fall behind a nation that is technologically and economically inferior is we have been out-strategied. The best way to offset the fact that Soviet strategy has turned out to be better than ours is to change that strategy.

Our next big investment in this strategic balance to me has to be based on a new strategy. Instead of mutual assured destruction we should assure our survival. Assuring our survival will be the greatest advantage to deterrence that I can think of, if in fact we could make the Russians realize that before they attack the United States or threaten to attack the United States they would have to crack through our greatest superiority and technology in space.

If the picket lines of defense of the United States were in space the Soviets would be faced with a problem that is beyond their technology to solve over a very long period.

If we simply add more land based aim points we leave them with just a mathematical addition to their current strategic problem; that is massing enough strength to overcome fixed targets. That is why the suggestion of the admiral.

I think Admiral Moorer is talking in terms also of a technological end run of the offensive problem. I say the short- and long-range answer to these problems has to encompass the unshackling of U.S. technology in such a way that not only forces but the people and the cities of the United States are offered some protection which our strategy of the past 10 to 15 years simply does not provide.

## PHILOSOPHICAL PROBLEMS WITH MAD THEORY

Senator **LAXALT**. Let me see if I understand the thrust of your testimony. Apparently you find a serious philosophical problem in connection with the basic of MAD. Is that correct?

General **GRAHAM**. Yes.

Senator **LAXALT**. The essence of that theory is we in this country will wait for a first strike and then we would build the capability for a strong counterpunch. Is that right?

General **GRAHAM**. That is right.

Senator **LAXALT**. How would you change that basic philosophy, that we would build into our strategic capability a first strike capability?

General **GRAHAM**. If we are going to deploy counterforce missiles like MX then our strategy should provide for them being used to counterforce the most dangerous of the Soviet weapon systems instead of absorbing them like a sponge.

The major difference in the strategic concept I am talking about is we must get away from a total reliance on offense, that in the end means the offense really has to be directed against Soviet cities and population because the strategy we have simply would have your counterforce shooting perhaps at empty holes. That does not make a lot of strategic sense.

What does make sense is to pose an effective deterrent which is one that puts so much doubt in the Soviet mind that they can neither threaten or actually attack the United States. I think we can do that if we pay some attention to defense while we are paying attention to the offense.

Senator **LAXALT**. General, you are not proposing that if we go to space ABM, that we discard completely our land-based ICBM system?

General **GRAHAM**. Absolutely not.

Senator **LAXALT**. This would be a complement to that?

General **GRAHAM**. It certainly would. If there were a defense in space right now enough to make the Soviets doubt that any particular group of warheads were going to hit Minuteman, Minuteman would not be vulnerable.

The defense and the offense are two sides of a military coin and have been throughout history. Throughout history, when one nation neglects one or the other and the French are a good example—we remember the Maginot line where everything was defense but in the war before that they had a concept called "toujours l'attaque." It was all offense and they killed off French manhood.

What we have done is to ignore one side of the coin and the offensive side of the coin which we still have is vulnerable and not now doing the job or at least in the near future will not do the job of deterring the Soviet Union.

## ABILITY OF UNITED STATES TO EMPLOY SPACE ABM SYSTEM

Senator **LAXALT**. To what extent is our technology developed so that the space ABM system is feasible?

General **GRAHAM**. The question I put to some knowledgeable in the area who are involved in space shuttle and so forth—the technology is there. We already have the technology to put into space a capacity to shoot at Soviet missiles on the rise before they spew warheads all over space and drop a good deal of any Soviet attack on the United States into the Arctic area.

Senator LAXALT. Do any of the panel know since you have all had prior experience, was this type of system ever seriously considered, in your knowledge, by this administration or past administrations?

### AIR FORCE BAMBI SYSTEM

General GRAHAM. Yes, it was. The Air Force had a program called Bambi that was designed to do this sort of thing with dinosaur-type vehicles, and so forth. There was sort of a battle between my old service, the Army, and the Air Force because the Army preferred a system that was based on the ground so everybody wore a brown suit and if you go to space, they would be wearing a blue suit.

Our space technology had not progressed to the point where it has now. Now people involved in the space program have estimated to me that within 3 or 4 years you could have a capability based on the Shuttle and on heat-seeking missiles, not lasers, but maybe later you could go to some kind of directed energy beam but even today to put up heat-seeking missiles that would be firing at one of the best infrared targets in the world which is a big hot missile with a flame coming out.

### RESTORATION OF MISSILE BALANCE

Senator LAXALT. Assuming that would be feasible and assuming we would not lose a lot of leadtime in the process, it is not your contention that we move away completely from improving our existing land-based ICBM system either in terms of working Minuteman III or going perhaps to something entirely new like MX?

General GRAHAM. No; I am trying to restore balance and not change the balance completely over to the defense.

Senator LAXALT. If I understand, you are suggesting in addition what we may do otherwise in connection with land-based ICBM's that we should be looking seriously at this other option of space ABM?

General GRAHAM. That is correct.

Admiral MOORER. Mr. Chairman, the biggest advantage we have over the Soviets is in technology. It has been my experience—and I have been present when actions of this kind have been taken—that we have imposed self-restraint on the technological improvement of our systems on the grounds that not to do so would provoke the Russians and it would be destabilizing.

The programs to improve the accuracy of our missile warheads have been deliberately canceled or deferred on conceptual or philosophical grounds rather than on technical grounds. When we have attempted to negotiate with the Soviets concerning the strategic balance overall, we have on several occasions mistakenly used the logic—and I have had Senators right here in this building use this logic—that we were not giving away anything if we agreed not to build an equivalent to the SS-18, or if we agreed not to put any missiles aboard surface ships, simply because not having a program to do so already in being, it would not cost anything to give up the concept.

In that process, we have repeatedly restrained our flexibility in the areas in which we have the advantage. I believe what General Graham is saying is that we should move out and take maximum advantage of technology, which is the area in which we do in fact have superiority.

General **Graham**. I think basically the reason why we are not farther along with the space-borne defense is because mutual assured destruction says safety lies in vulnerability, that we should remain vulnerable so as to maintain this balance of terror. It is militarily idiotic but it is the prevailing view and the reason why we have no defenses and the reason we have gotten rid of such defenses as we once had.

Senator **Laxalt**. Apparently we have been on mutual assured destruction theory for a long time in this country.

General **Graham**. Sixteen years, sir. It has been since the midsixties.

Senator **Laxalt**. This has cut through both Republican and Democrat administrations.

General **Graham**. Absolutely.

### WORKABILITY OF FUNDAMENTAL CONCEPT IN MISSILE DEFENSE

Senator **Laxalt**. Why have we not taken a close look at the whole fundamental concept and perhaps moved in a different direction?

General **Graham**. I think for a while it looked like it was working.

Senator **Laxalt**. This is until 1977 when they developed the capability to knock out our ICBM's? Was that the biggest event? That was indicated yesterday.

General **Graham**. In my view, it became pretty obvious that the Soviets were not buying this concept and were going for counterforce capabilities and so forth by the early 1970's. It took some time for this to sink in around Washington.

Senator **Laxalt**. For them to develop the capability.

General **Graham**. That is right.

### MOVE AWAY FROM MUTUAL ASSURED DESTRUCTION

Dr. **Van Cleave**. I think conceptually there has been some movement away from reliance entirely on mutual assured destruction. I think, unfortunately, we have not been willing to put the money into the programs to enable proper movement away from that and toward damage limiting and war survival capability, and in that regard, I agree in principle with what General Graham has to say.

I am a little concerned because my immediate problem is an immediate problem. I am more concerned that we deter the Soviet Union from having the capability to threaten that attack for political purposes.

I do not know about the space ABM. I certainly share philosophically all of General Graham's hopes for this particular system. In my view it is somewhat too far off to help these short-term problems, that is to say it is a fairly low confidence approach for the short term and it is really unclear to me who is ahead in this area; technological advantage accruing to the United States is one thing and quite frequently it is little more than an article of faith because it takes an effort to maintain technological advantage and that is an effort we have not made relative to the effort expended by the Soviet Union for over a decade.

The reason we are falling behind is not merely the differences in strategy but a difference in objectives and a fundamental difference they are willing to expend the effort and we are not.

With those caveats I would agree in principle but I would urge we get back to look at the immediate problem which is what we do about the current force we have and how to assure its survivability and hopefully augment its capability.

### HUMAN DESTRUCTION PHILOSOPHY

Senator **Garn.** General Graham, let me make a comment. I have never understood our strategic philosophy, which is based on the proposition of killing people. Every time I hear the President say that one submarine can destroy a large number of Soviet cities, that disturbs me from a philosophical and a humane standpoint. I think MAD is a proper acronym; it is mad.

It disturbs me that the President, who is fond of talking about human rights, should talk in that manner. I would suggest we start talking about attacking military targets and silos and developing a counterforce capability which is much more acceptable to me than talking about how we can blow up so many Soviet cities.

### U.S. PROJECTIONS ON SOVIET DEPLOYMENT OF STRATEGIC FORCES

Let me get back to some more specifics. How accurate have our projections been on the development of Soviet ICBM's and the deployment of Soviet strategic forces over the last 10 to 15 years?

General **Graham.** Through about 1963, the intelligence people and not me but most of them were overstating the case. From about the midsixties on there was really a gross and dangerous underestimate of how fast the Soviets were going to build up their ICBM force; much of it was based on assumptions that the Soviets bought the MAD concept because the MAD concept says you only need a limited number of missiles and if both sides have sufficient number of people slaughtering capabilities, then you have reached a stability and nobody would want to go beyond it.

Many people who clung to this notion simply could not bring bring themselves to believe despite masses of evidence that it was the case that the Soviets were going to go beyond that and look for a capability to fight and win a nuclear war.

Senator **Garn.** In other words we went from the so-called "missile gap" in the early 1960's, which was exaggerated, and swung the pendulum in the other direction, to the point of underestimating the strength of the Soviets' strategic forces—with their SS–17's, 18's, 19's and 20's and so on?

General **Graham.** That is correct.

### ACTION-REACTION SYNDROME IN MISSILE DEVELOPMENT

Senator **Garn.** We have now gone too far. In fact, there are now additional generations of new missiles the Soviets are developing.

Do you have any evidence to dispute the assertions of those who continue to say that all of these Soviet actions have been a response to us, and, as a matter of fact, if we had not MIRVed, they would not have MIRVed, if we had not done this, they would not have done that?

Is it not clear, looking into the past, that the Soviets have done what they wanted regardless of our efforts? In fact, have we not made continual unilateral decisions, such as stopping the Minuteman III production line, placing a limit on ourselves of 1,054 ICBM's, and cancelling the B-1 without any reciprocation on their part?

General GRAHAM. Senator Garn, you are absolutely right. Anybody who is willing to go back and look at the record of Soviet programs should no longer talk about this terrible action-reaction cycle where the United States is really the perpetrator of all Soviet increases in their military inventories whether it is strategic or tactical or conventional or naval.

The Soviet growth in military capabilities has to do with the Soviet concept of what they want and it has precious little to do with what American actions are.

The only exception I would see to that is a case which works in the opposite direction. I think Soviet interest in coming up with a strategic bomber, with the Backfire bomber and now coming up with additional bombers had something to do with the deactivation of the air defense of the United States. They saw an opportunity arise there because the United States was not going to defend itself against the MAD bomber.

### ACCURACY OF U.S. PROJECTIONS OF SOVIET ICBM CAPABILITY

Senator GARN. Do you have any reason to believe our current projections of Soviet ICBM capability are any more accurate than they have been in the last decade?

General GRAHAM. I think they are. I think when Professor Van Cleave, Dick Pipes, myself and others gave them quite a scare in the Team A process——

Senator GARN. Team A won.

General GRAHAM. Team A won. As I understand it the estimates are slipping back into their old mold which is once again to say do not worry too much about the Soviets.

Senator GARN. I take it none of you believe that the ICBM vulnerability problem is a theoretical one, that it is a real threat based on what the Soviets are doing?

Dr. VAN CLEAVE. Yes, indeed.

Admiral MOORER. Senator Garn, if I may add to what you have said; I believe that it is to the credit of the people of the United States and our Government that a strong effort has been made to reduce the inventories of nuclear weapons worldwide.

Our problem is we cannot believe what the Soviets tell us. Following the Cuban missile crisis, Mr. Khrushchev told Mr. John McCloy that they—the Russians—would do exactly what they were asked to do, but that they would never get caught in that position again.

During the SALT I negotiations, as Dr. Van Cleave will tell you, we spent an inordinate amount of time trying to get the Russians to agree to cease and desist on MIRVing their missiles. I personally heard Mr. Brezhnev when he was here put this matter to rest when he said "We will never be denied that technology."

I think what has happened is that while we have exercised restraint, the Soviets have gone ahead with technical advances as rapidly as they could, all the wayy across the weapon system spectrum.

In addition, in talking about defense, the SALT I agreement and the SALT I Treaty with respect to defensive forces, did permit a defense around Washington, D.C.

Senator GARN. That is the last place I would defend in the country.

Admiral MOORER. It really did not say Washington, D.C. It said the command and control system. I think that is a very vital requirement, because if we are going to always shoot second—and I believe in a democracy it would be almost impossible to get any President of the United States to do it first—then it is mandatory that the command and control system survive.

## CONTINUATION OF TRIAD VITAL PART OF NATIONAL SECURITY

Senator GARN. Admiral, do you believe that continuation of the Triad is a vital part of our national security?

Admiral MOORER. Yes. However, I do not believe in that connection that we should continue by adding more and more missiles based in the United States. I am not suggesting that you inactivate the Minuteman or an improved Minuteman or vertical launches which Dr. Van Cleave described, or discontinue or even slow MX development. But, I do not think we should continue to add numerically to the fixed missile systems inside our own country.

Senator GARN. You would agree we should have a balance between the three legs of the Triad. We may disagree on some grounds as to where that balance would occur. You do feel we need all three legs in some measure of balance—what I am specifically referring to is that I think one leg is already badly injured by the cancellation of the B-1. I think that was a tragic mistake by this administration.

I do not see how anyone can defend the viability of the B-52. From my practical experience as a pilot, I certainly cannot defend the B-52 as a viable aircraft into the 1990's or even the 1980's.

It worries me that the air-breathing leg of the Triad has been injured. The second leg now comes along in that we will soon be faced with the vulnerability of Minuteman III. I am certainly not advocating precipitate action. Rather, we are talking about a replacement, and that leads into my next question.

Do you have any concerns about the third leg of the Triad, beyond what you have already said today with respect to the decrease in the number of missile submarines as Polaris-Poseidons go out of existence much more rapidly than Tridents come on line?

## PROBLEMS IN THREE LEGS OF TRIAD

In my opinion, three legs of the Triad are in some different degree of trouble, because of the neglect of Republican and Democratic administrations and Congresses over the last 10 years. All have been unwilling to make the tough decisions, and have made overwhelming decisions in favor of butter rather than guns, as we use those cliches.

The budget has shifted from where we were spending more than 50 percent on defense and 25 percent on social programs to just the opposite—a total turn around.

In some respects this may have been necessary, but I think it has gone too far.

I am concerned about all three legs of the Triad, and specifically, with your naval background, I would like to know if you are concerned about what is happening at sea with the gap that, although it is not talked about very much, is going to occur in sea launch ballistic missiles in the mideighties.

Admiral MOORER. Absolutely. I agree with you across the board. I think it is unfortunate but in this country today every problem we have both domestically and internationally is self-inflicted.

### TRIDENT CONSTRUCTION

Senator GARN. What rate of Trident construction do you think is adequate?

Admiral MOORER. I think the current rate should be increased by about 50 percent. If we are really serious about this problem and are not just going to nibble at it, I believe we should go for a new bomber as you said and improve the land based system.

I am not in favor of just putting more and more missiles in the center of the United States. I think we should improve the sea based capability.

### HORIZONTAL BUNKERS IN MX SYSTEM

Senator GARN. Dr. Van Cleave, do you believe the administration is correct in arguing we need horizontal bunkers in the MX system? It has been pointed out before, and I have tried to point it out many times, that the Air Force's original recommendation was the vertical shelter system. The only apparent argument against vertical now is the time factor involved in moving missiles from one shelter to another.

What is your feeling about horizontal versus vertical?

Dr. VAN CLEAVE. I think it is clear the vertical shelter was always favored over the horizontal in the past for survivability and for cost reasons as well as for confidence in our knowledge about the performance of that particular shelter system compared to the horizontal.

The Air Force continues to acknowledge that we are having expected success with whatever work we are doing on the vertical shelters and they are less expensive.

I believe they are or could be made significantly less expensive than the horizontal shelters.

Senator GARN. They are not only less expensive, but they can have a greater degree of hardness.

Dr. VAN CLEAVE. Yes, without any shadow of a doubt. I think also one thing that would be clearly an advantage to the vertical shelters is inasmuch as they are by any study less expensive than the horizontal shelters then clearly they should have a greater expansion potential if it is necessary to expand to meet the threat in this way.

For growth, the more cost effective you can be in terms of meeting the growth of the threat and the cost of adding shelters, clearly the better off you are and I think the vertical system offers that.

I am not sure exactly what we buy by this added mobility that the horizontal shelter is supposed to give us. We know and the community agrees that movement for re-positioning periodically is necessary but no one has ever agreed as to whether additional mobility is really necessary.

Before the loading dock thing we had an automated dash from the shelter and this was eliminated even though it was apparently one of the reasons to shift to this particular system. We go to one that assumes strategic warning. It really asumes you have lost such confidence in your preservation of location that you are willing to compromise it thoroughly. I do not quite understand how that comes about.

The location uncertainty is supposed to be a secret. If the Soviets know where the missile is, then that is certainly going to be a deep secret and when and how we know the Soviets know where the missile is will be a deep, deep secret.

I do not know when we know that with enough confidence to thoroughly eliminate the concealment which should be the major part of the system. I am afraid if the Air Force is allowed to have the mobility as a crutch they may not work hard enough on solving the concealment problems.

### LAUNCH ON WARNING STRATEGY

Senator **Laxalt**. Do you believe the launch on warning is a viable strategy?

Dr. **Van Cleave**. First of all I do not believe in any case that it is a desirable strategy. I cannot imagine it is an option that a country with our resources should ever have to resort to in desperation. Second, I have my grave doubts that it could be a viable strategy. I have my grave doubts it could be made to work in a rational way with sufficient confidence.

I think in order to get a launch on warning capability upon which we could have some confidence would require at least as much effort and expenditure as would be required to avoid that option in the first place.

### VALUE OF HORIZONTAL AND VERTICAL MIX FOR MX SYSTEM

Senator **Laxalt**. Dr. Van Cleave, in terms of going to something like MX horizontal and in terms of following the kind of theory that you have indicated here in redesigning and improving the existing ICBM Minuteman system, why would it not make sense to go to a little of both so you would have the best of both worlds?

We would have more flexibility. We would probably have some cost savings. More importantly from all I have seen and heard we could gain some valuable leadtimes in going to the existing Minuteman as opposed to a brand new system.

Dr. **Van Cleave**. We believe we could do all that. That was essentially the message I wanted to impart this morning. We could solve a good deal of the lengthy leadtime problem and meet the threat more appropriately by going with redeployment of Minuteman III and this need not sacrifice the longer term program.

If I had Minuteman III more survivably deployed I am less sensitive to slippages in the long-term program, I am much safer than I would be if I did not have this particular hedge.

I support the capability that the MX missile represents. That missile could easily be phased into the same deployment mode that I advocate putting Minuteman III in at some later time or if it turns out still to be an optimum solution to deploy it somewhere else such as in your States but in fewer numbers then that would be an option we would retain as well.

I would say while I support the overall capability the MX missile represents I doubt very much if it were not for SALT that we would have gone in that direction, of a few very large missiles to get that capability.

I would also recommend an R. & D. program on a much smaller missile which will lend itself more to both concealment and mobility which, free of SALT constraints, we might deploy in much greater numbers to get the same capability.

Senator GARN. I think you are correct. MX has been driven, and the decisions were made, as part of the SALT selling process. Some of those same people now oppose MX, and I believe SALT helped create it.

Dr. VAN CLEAVE. I agree.

Senator LAXALT. We had testimony where we were looking into the possibility that without SALT constraints we are going to get into a shelter race. The Soviets as a matter of strategy could simply decide to saturate the whole MX missile system.

## MISSILES NEEDED TO MATCH SOVIET THREAT

We have had access to some numbers mostly speculative indicating that instead of the 200 missiles and the 4,600 shelters we would be looking at 450 missiles, 23,000 shelters and 100 billion fiscal year 1980 dollars in order to keep up with a maximum Soviet effort. Will we get into that kind of situation and let me ask General Graham to put your intelligence hat on for a moment, without SALT constraints is this a fairly realistic scenario?

General GRAHAM. I think not. A lot of these calculations of how many different thousands of warheads for the Soviets there are, I think they have not been measured against Soviet nuclear material production capability.

We always had a wide measure of uncertainty about that. I can remember the day when we found to our astonishment that the Soviets had on some of their strategic ballistic missiles chemical warheads, not because they preferred chemical warheads but because they did not have nuclear weapons to put on them.

I think before anybody assumes all the Soviets have to do is increase the number of warheads, they have one more thing to do which is increase the amount of fissionable material to make those warheads of the right quality and so forth and I remember trying to make this case and it was certainly valid at the time when the arguments against the antiballistic missile system had to do with the Soviets coming up with this overwhelming capability.

The overwhelming capability really bore no relationship to Soviet ability to produce the nuclear.

Senator LAXALT. In terms of their realistic resources and capability you think this is an unrealistic scenario?

General GRAHAM. I think so, at least for quite a long time. I do think any number of fixed targets presents the Soviets with a solvable mathematical equation that they can continue their strategy and eventually be able to overwhelm what you have. It is not realistic to assume that would happen in 8 to 10 years.

Senator LAXALT. I do not suppose they would have an unlimited treasury either.

General GRAHAM. No, they do not. I think they are spending at about their maximum right now. Those who say we dare not do anything to take care of our own security interests because the Soviets will react with huge programs, I simply do not believe so. They are already doing very close to the maximum of what they can do.

Senator LAXALT. It has the same inhibiting process we have and that is money and lack thereof.

General GRAHAM. Not the same one because they do not have Ralph Nader out there.

Senator LAXALT. Or Congress.

General GRAHAM. They do have finite limitations on resources.

### EXPERIENCE IN INTELLIGENCE PROGRAMS

Dr. VAN CLEAVE. On the intelligence projections, General Graham referred to our experience with this series of years of gross underestimation but a new problem began to emerge in the middle seventies. That was the use of intelligence projections principally to support the pro-SALT case.

What was done in essence was to use what was formally regarded as the greater than expected threat, a boundary case and now we call it the non-SALT case and treat it as if it were reality.

You could always show that the SALT limits accomplished something by doing that and you could sell whatever bad agreement you wanted because theoretically they could do more in a sense.

What we ought to know in a whole decade of SALT experience is the Soviets are going to do what they want to do and not be sensitive to SALT considerations but to other things. The question is how can we influence their intentions and what they do?

In my view clearly if we present for them an opportunity cheaply to get a counterforce capability against any component of our Triad they will do so. That is precisely what they have done already with the ICBM force.

If on the other hand we were to take the steps necessary either to deny them that capability or to make it extremely difficult or extremely costly then I believe we have a chance to divert their attention from that.

In the shelter against warhead game it is clear they control the numerics of the threat. We control the numerics of survivability. What we have to do is demonstrate that an advantage lies in the latter. If they really intend to pursue that game, for them it is going to be a losing game. We have to do two things: Assure the shelters are cheaper than what they have to pay to overcome them and put a strong, hard target counterforce capability into our systems so that they cannot put all their effort on building up more and more, but must themselves look to the survivability of their assistance.

I think the MX program with what I suggest moves in that direction.

Senator LAXALT. Thank you very much, gentlemen.

Our second panel is Dr. Drell and Captain Draim and Dr. Scoville. I understand Dr. Drell will lead followed by Dr. Scoville and closing will be Captain Draim.

Dr. Drell?

## STANFORD LINEAR ACCELERATOR CENTER

## STATEMENT OF SIDNEY D. DRELL, DEUPTY DIRECTOR AND EXECUTIVE HEAD OF THEORETICAL PHYSICS, STANFORD LINEAR ACCELERATOR CENTER

### MINUTEMAN VULNERABILITY

Dr. DRELL. Thank you very much for this opportunity to appear before this committee in these very important hearings on the future basing of the new MX missile.

I am a physicist with a background of more than 20 years of work on national security problems of the United States as a consultant to various offices and departments of the Government including the Congress.

I have worked on the Minuteman vulnerability problem extensively.

In my testimony today I speak as an individual and represent no official views.

### PREPARED STATEMENT

I ask that my prepared statement be placed in the record after which I will summarize.

Senator LAXALT. It will be inserted at this point.

[The statement follows:]

## PREPARED STATEMENT OF SIDNEY D. DRELL

Thank you very much for the opportunity to appear before this committee in these very important hearings on the future basing of the new MX missile. I am a physicist with a background of more than 20 years of work on national security programs of the United States as a consultant to various offices and departments of the U.S. Government. A curriculum vita listing my present and past activities is appended to this statement. I have worked extensively on the problem of Minuteman vulnerability and alternate basing schemes during the past 2 years. In my testimony today I speak as an individual and represent no official views.

### THE GROWING THREAT TO MINUTEMAN

During the past two decades the United States and Soviet Union have made major efforts to deploy their strategic nuclear forces so that in very large measure they will be immune to the threat of destruction by a preemptive strike targeted against them. Survivability is widely recognized to be an important aspect of a deterrent force.

Therefore both the United States and the Soviet Union have based their ICBMs in hardened underground silos that are highly resistant to effects of a nuclear warhead—both blast and electromagnetic pulse. Likewise, both the United States and the Soviet Union have deployed a sizable portion of their nuclear warheads on submarine-launched ballistic missiles (SLBMs) that are launched from nuclear submarines (SSBN) moving invisibly under the ocean's surface. Relying on their mobility and operational procedure, the SLBMs are currently a highly survivable force. In the decade ahead, which is a reasonable horizon for such technological projections, there is high confidence that the SSBN/SLBMs can remain highly survivable and effective. Finally, in order to maintain a broad diversity of forces with different operational characteristics, different vulnerabilities, and very different failure modes, the United States has developed a strategic bomber force which will survive by being launched on warning of impending attack.

In the 1980s the improvement in weapons technology threatens fixed land-based ICBMs with obsolescence. Two factors are responsible. One is the achievement of a very high accuracy and reliability by missiles of intercontinental range. The second is the development and extensive deployment of multiple independently targetable reentry vehicles (MIRVs) enabling single missiles to threaten effectively the destruction of more than several of an opponent's silos.

Thus the U.S. land-based ICBM force of 1,000 Minuteman and 54 Titan missiles is becoming increasingly vulnerable to the threat of a counterforce attack by the Soviet Union. This increasing vulnerability is a consequence of improvements in Soviet weapons technology. Of particular concern are the higher accuracy of their ICBMs and their rapidly growing numbers of MIRVed ICBMs, the bulk of which are deployed with 6 RVs (SS–19s) or 10 RVs (SS–18s). If these trends continue, a Soviet threat to destroy a very large fraction of our Minuteman missiles could materialize in the early to mid-1980s. Defense spokesmen cite a threat to destroy as much as 90 percent of the U.S. ICBM force in the early 1980s. This analysis is made in spite of the enormous difficulty in actually executing such an attack successfully. It would require the almost simultaneous and very accurate arrival of some 2,000 reliable warheads at the 1,000 Minuteman silos. Furthermore they would be flying on trajectories never before flight tested. Therefore many view Minuteman vulnerability as little more than a paper-and-pencil threat. Nevertheless, the Soviets appear to be headed on a path that can significantly reduce U.S. confidence in the invulnerability of our land-based ICBM's in the next decade.

The loss of the Minuteman force would not mean the loss of the U.S. retaliatory capability for assured destruction, unless a serious threat were to develop to the other two components of our strategic triad—the seaborne and airborne components. Currently and for the foreseeable future these are projected to be both highly survivable and very robust, and they are being continually improved at great cost. The SLBM force is being expanded and strengthened with new Trident submarines and Trident-I missiles whose longer range greatly increases the SSBN ocean operating area. The bomber force is being enhanced by the development of long-range air-launched cruise missiles that will increase the bombers' fire power substantially and remove their need to overfly and penetrate the extensive Soviet air defenses. The alert status of the bomber force can be further increased by operational procedures.

Moreover, loss of the ICBM force would still leave intact approximately three-fourths of the total number of nuclear warheads in the currently deployed U.S. strategic forces, and approximately two-thirds of their total throw-weight. This would constitute a very robust residual force which could be retargeted to compensate as much as possible for the lost Minuteman warheads, particularly against the most valuable and vulnerable targets.

Nevertheless there still remains a fundamental question: should the United States simply accept, without a response, a decrease in margin of safety of the survivability of our strategic retaliatory power as a result of Soviet deployments? The answer given by the U.S. Government is clear: to simply ignore the problem of a growing vulnerability of our Minuteman is not an acceptable policy for the United States. I agree with this answer. The issue then has become not whether, but how to respond to the growing Soviet ICBM threat to the U.S. Minuteman force.

It is also generally recognized that there is great value in maintaining a diversity of systems with different operational characteristics, and thereby different potential vulnerabilities or failure modes. We may feel confident today and in the foreseeable future that our Poseidon/Trident nuclear missile submarines and our alert strategic bomber force, soon to be outfitted with long-range cruise missiles, are secure against direct attack and provide a flexible and effective deterrent. However, technology forecasting is not altogether free of risks which can affect force survivability and effectiveness beyond the coming decade, when today's weapons decisions will be realized as operational deployment. This argues against simply replacing our increasingly vulnerable fixed-silo ICBMs by more of the same kinds of SLBMs and bombers as presently deployed. One need not retain a deterrent TRIAD forever, especially if one component is seen as necessarily more vulnerable than an equal-cost addition to another component, but the natural occasion to reduce its scope will be part of overall progress in arms reductions and not as a unilateral response to a growing Soviet threat.

### THE SUM BASING MODE

A basing scheme that is survivable and which in major aspects retains the desired characteristics of the current U.S. ICBM force is the proposed shallow underwater mobile (SUM) force. SUM would deploy small non-nuclear-powered submarines operating in near-coastal waters off the East and West Coasts of the continental United States. Each submarine would carry several encapsulated missiles horizontally mounted external to its pressure hull. This concept can be adapted to a wide variety of missiles with ICBM range. Here we shall describe the characteristic parameters of SUM assuming that it is deployed with the new MX missile now in engineering development. The MX is a 92-inch diameter, 71-foot-long missile with a design weight of 192,000 lbs. and loading 10 MIRVs each with an explosive yield in the range of 350–500 kilotons. Encapsulated, its weight would be typically doubled. This sets the scale size of SUM as a submarine of 450 tons or somewhat larger, loading two MX missiles, as illustrated in Figure 1, for a total displacement of close to 1000 tons. Correspondingly a 1000-ton pressure hull could carry 4 horizontally-mounted MX capsules.

SUM would be deployed within an ocean band 200 nautical miles (mmi) wide. This band could extend off-shore on the Pacific coast line; in order to stay off the continental shelf on the East coast, it could begin about 100 mmi from the coast and extend to a distance of roughly 300 mmi from the shoreline. This provides an ocean operating area that is sufficiently large so that it cannot be barraged by the entire Soviet ICBM throw-weight. The number of SUM boats deployed will correspond to the desired level of survivable megatonnage in the U.S. targetting plan. Since they are deployed in near-coastal waters, the SUM boats need not travel fast nor far to station. They, therefore, need not and should not be nuclear powered; in particular, inexpensive acoustically quiet and state-of-the-art technology fuel cells would remove any need for surfacing and snorkeling. In addition to the difficulties presented to Soviet antisubmarine warfare (ASW) efforts by the very quiet electric drive, SUM presents a very different as well as difficult targetting problem since its operating area is close to the United States, in waters under direct control by the U.S. Navy.

Communications with SUM are also easier than with our present far-flung deployment of Poseidon/Trident nuclear submarines. For example, SUM could be in constant communication with the national command authority, under normal circumstances, via very low frequency (VLF) radio signals in the 16 KHz frequency region. These could be received by an expendable "awash-buoy" antenna at, or just below, the water surface and connected to the patrolling submarine by a very fine slack wire. Ultimately many other communication systems are available via aircraft VLF transmitters or ultra-high frequency (UHF) signals transmitted via satellites.

The submarines would not require a good inertial navigation system of their own, but could rely on the missiles' navigation systems to locate their own positions. Communications with the NAVSTAR-satellite Global Positioning System (GPS) or with the network of on-shore transmitters (a proliferated and inexpensive ground beacon system—GBS) could assist SUM in achieving very high accuracy for the missiles, better than present land-based ICBMs. The operation could be highly automated, much like the system used for Skylab.

Crew size could be minimal, typically a crew of 12–15 forming 4 watches of 3–4 each. During each tour of about three weeks, the crew would serve primarily to monitor equipment, to perform routine maintenance and safety checks on the submarine and to retain positive control over the missiles. Such a tour of duty would be sufficient to ensure that the submarine spends a large fraction of the time on-station, since the patrol area is so near the submarine base.

SUM is naturally covered by the SALT II provisions for counting and verifying launchers. Submarine construction at present is verified by national technical means—i.e., satellite observation. In contrast to the provisions of the interim SALT I agreement, which limited the number of submarines, SALT II limits only the number of missile tubes, which are added into the count of launcher numbers subsequent to the commissioning of a submarine.

The basic U.S. strategy has long been to seek a distribution of forces with different operational and physical characteristics so that the different components of our strategic nuclear deterrent have different potential vulnerabilities and failure modes. The SUM system is consistent with this strategy because it vulnerabilities differ substantially from those of the current SLBM force.

### THE RACETRACK BASING AND ITS DEFICIENCIES

The administration has rejected the possibility of "moving to sea" as a means of solving the Minuteman vulnerability problem and has recommended instead proceeding with the racetrack basing mode for the MX missile. They have argued that in the interest of maintaining diversity of the U.S. strategic deterrent the United States should retain a land-based component. The racetrack basing mode is technologically straightforward but presents severe operational and strategic problems. Primary among these are the sensitivity of the racetrack deployment to the threat, the requirement that essentially the entire system be deployed before there is any gain in survivable megatonnage, and the necessity for maintaining high confidence in secrecy, deception and simulation in the middle of our society. Let me explain this point further.

It is characteristic of any multiple aimpoint system, such as the racetrack, that it is sensitive to the numbers of threatening Soviet warheads. This is illustrated in Figure 2 which shows the surviving equivalent megatonnage for a plausible set of assumptions as listed. In the figure, the number of threatening Soviet RVs is projected as growing to the SALT II limits (and each is credited with a probability of 80 percent of destroying a missile against which it is targetted; i.e., $P_d=0.8$). Of particular importance in calculations of surviving megatonnage[1] is the fractionation limit on Soviet MIRVed ICBMs to 10 warheads on the large SS—18 missile and to 6 warheads on the more numerously deployed SS-19's. Without these limits the number of threatening Soviet ICBM warheads could well triple[2] with the construction of no new Soviet missiles. With projected improvements of missile accuracy for the 1980's there could then be up to approximately 17,000 warheads that would be effective silo- or shelter-killers on the Soviet ICBM force. This would require the United States to triple, and then some, the number of racetrack shelters in order to maintain the currently planned level of surviving megatonnage with a deployment of 200 MX missiles. This in turn would mean a tripling of the length of the racetracks, consuming ever more land in the process. The alternative of placing the individual shelters substantially closer together than their currently planned spacing of 7,000 feet in order to avoid greater land usage would risk the possibility that each incoming warhead could destroy more than one shelter; this would not be consistent with prudent planning. SALT II is thus indispensable for making the threat projection against which the racetrack system must be sized.

The numbers cited above show that without the SALT II fractionation limits, along with the SALT II ceilings on numbers of MIRVed missiles, the racetrack deployment is open-ended and could spur a race between Soviet warheads and U.S. shelters that could consume ever more land and dollars. Alternatively, we would have to deploy significantly larger numbers of MX missiles themselves, thereby increasing both costs and potential levels of destruction if a conflict were ever to occur.

It is also clear from the figure that anything less than the full deployment of the racetrack system against an accurately projected threat is of little real value to the United States since we do not even begin to realize an appreciable gain in retaliatory capability as measured by surviving megatonnage until the deployment of most of the shelters has been completed. The SUM system that has been proposed has no such deficiency. As a result of its mobility and concealment under water, it cannot be effectively barraged or pattern-bombed by the entire Soviet ICBM force. Hence, each additional missile that is deployed contributes significantly to the surviving megatonnage. It is thus an advantage of SUM relative to the racetrack that it provides no incentive for the Soviet Union to further fractionate its warheads in violation of the SALT II provisions.

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[1] EMT, the Equivalent Megatonnage, is a measure of the effectiveness of U.S. warheads against a range of Soviet targets.

[2] Assuming no other limits, such as limits on fissionable materials.

Finally, I note that the racetrack relies on deception as well as concealment for its survivability in contrast to SUM which depends only on concealment based on the submarines' operational procedures and characteristics. It is difficult for me to imagine an advantage for the United States with its open society in competing with the closed Soviet society to maintain secrecy and deception. The United States would be choosing Soviet home turf for a competition almost bound to occur if past Soviet tendencies to follow the U.S. lead in weapons programs are a valid guide to the future. The Soviet system is far better adapted to the imposition of controls, secrecy, and limitations on its populations; and they have a much larger land mass in which to deploy and "hide" mobile ICBMs. We should prefer to compete with the Soviets on our own home turf of mobility based upon new systems and reliable technologies. The SUM deployment, like our present SLBMs, would rely heavily on concealment, based on its technical characteristics, rather than on deception which is essential to the racetrack deployment.

Other difficulties of the racetrack include the complex operational procedures for insuring that no more than one genuine MX missile has been introduced along with all the decoys on each racetrack loop. These procedures require building barriers to be disassembled and reassembled on the access tracks to each loop as well as opening ceiling plugs in the final assembly areas for satellite viewing. Thus new cooperative procedures are required to supplement the "national technical means" on which verification of missile deployment now relies. Furthermore, the racetrack, in common with all multiple protective shelter (MPS) systems, could be used effectively for a rapid breakout from any formally negotiated or informally agreed ceiling on numbers of missile launchers. In the absence of direct verification of missile production there is always the possibility of some clandestine production and deployment of missiles in warehouses or other soft structures from which they would be readily launched. However, MPS deployments allow the additional capability of rapidly installing such missiles in hardened launch silos with tested and reliable $C^3$. Hence the effect of breakout could be more severe and provide more political leverage in a crisis.

### RESPONSE TO THE DEFENSE DEPARTMENT ANALYSIS OF SUM

An April 9, 1980 the Defense Department issued a report [3] with their analysis of the SUM system. Three conclusions in this report formed the basis for their rejecting the SUM system:

1. "SUM is unlikely to be cheaper than MX; considerable technical advances have to be invoked to make it comparable to cost to MX (or Trident) type systems.

2. "SUM is unlikely to be available before the 1990's.

3. "SUM must operate in deep waters as a short range submarine with no apparent advantage over conventional submarines such as Trident. Therefore, substituting SUM for MX would represent an abandoning of the Triad in favor of a Dyad of bombers and submarines, not the creation of Quadrad."

I have responded to these three criticisms of SUM in a letter to Congressman John Seiberling following informal hearings he conducted on April 3, 1980. A copy of that response [4] is appended for the record of these hearings. Here I will further amplify the arguments presented there:

1. "SUM is unlikely to be cheaper than MX; considerable technical advances have to be invoked to make it comparable to cost to MX (or Trident) type systems."

A review of the costing analysis in the DOD study leads me to conclude that they have overestimated the cost of a SUM system by approximately $10 billion. and annual operating and support cost of $0.8 billion, corresponding to a 10-year Their figures for SUM lead to a total investment and R&D cost of $27.6 billion O&S cost of $8 billion. According to my analysis, the investment plus R&D cost for SUM is approximately $20 to $21 billion and the total O&S cost for 10 years are $5 billion. These numbers are both in fiscal year 1980 dollars. The differences between these figures arise from the following considerations. SUM deploys relatively simple and small fuel-cell-powered submarines in near coastal waters and can be anticipated on very conservative grounds as having a 60 percent availability for submarines and missiles. That is, 60 percent of the total fleet should be counted on for the deployed, survivable megatonnage. This figure of 60 percent is a very conservative one based on operational simplicity of the submarines, proximity of the basing to the near coastal deployment areas and survivability of the small, quiet SUM boats in the ocean. On the basis of this assumption and on the basis of the same design parameters used in the DOD study, a total force of 40 SUM boats with an 1100-ton displacement, each carrying 4 MX missiles, provides for 100 MX missiles, or 1,000 survivable RV's, on station. This is the same level survivable megatonnage to which the racetrack has been designed against a project Soviet threat as limited by SALT II.

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[3] "An Evaluation of the Shallow Underwater Missile (SUM) Concept" prepared by the Office of the Deputy Under Secretary of Defense for Research and Engineering (Strategic and Space Systems), Apr. 9, 1980.

[4] Dated Apr. 11, 1980, along with a similar one from Dr. Richard L. Garwin dated Apr. 7, 1980.

SUM is a much simpler system in comparison with Poseidon or Trident submarines, for which 50 percent is the long-term average for the availability of the Poseidon missiles and boats. This figure includes a 2-year stand-down every 8 years for recording the nuclear powerplants. On the basis of 60 percent availability (and I see no basic reason that the figure shouldn't be even higher), there is a 20 percent reduction in investment costs. Moreover, the SUM concept calls for the submarines to rely on the missiles's guidance system to navigate and locate their position with accuracy. In contrast, the DOD study provided for an elaborate and expensive electronics suite in the submarines for accurate navigation. If we appropriately reduce the cost of the electronics in keeping with the SUM concept and if we assume 60 percent availability, corresponding to a force of 40 rather than 50 SUM boats as proposed in the DOD study, there is a saving in the investment costs of approxmiately $3.5 billion.

In addition, the DOD study included an investment cost of $6 billlion for three new bases from which the SUM system would be deployed. This, I believe, is a gross overestimate. In the DOD study the cost of one base for 11 Trident boats is given as $2 billion. Such a Trident force would have a total displacement of some 200,000 tons which is approximately 2½ times larger than that of the planned SUM deployment (of 40 boats, each displacing roughly 1,100 tons plus 1,000 tons for the 4 MX missile capsules; the tonnage is roughly the same in the original SUM proposal of approximately 80 boats, each displacing approximately 450 tons and carrying 2 encapsulated MX missiles). The basing cost for such a SUM force should be at most $2–$3 billion allowing for two bases, each handling only 20 percent of the tonnage of the one costed above for the Tridents. The origin of the $6 billion figure in the DOD report seems to lie in the assumption of three bases for a force of 50 much larger submarines (1,800-ton diesel-electric submarines operating at distances as far as 1,000 miles off shore) which the Navy study, still to be released, designed. This has very little to do with the SUM proposal. I see, therefore, an additional saving in investment costs of approximately $3.5 billion relative to the DOD study.

Finally, there will be a reduction in the O&S costs corresponding to the reduction in tonnage and basing requirements. Scaling down the DOD estimate of $0.8 billion annual costs by these factors leads to an estimate of $0.5 billion. This is in line with the projected racetrack figure for O&S and seems very reasonable, especially in view of the lower manpower requirements of the SUM system. This estimate of a 10-year total O&S cost of $5 billion leads to an additional savings of $3 billion relative to the DOD study. All in all, this adds up to some $10 billion saving for a SUM deployment relative to the DOD study. I emphasize that neither their analysis nor this one can be viewed as having any precision. The above cost arguments for SUM are incomplete and cannot serve as a solid basis for a decision. Evidently much more work is needed on this score.

2. "SUM is unlikely to be available before the 1990's."

I searched in vain for an analytic basis for arriving at this conclusion but found none at all.

Past experience shows that, if we are determined to, we should be able to initiate a SUM deployment well before the 1990's. Let us recall the history of the *Polaris* project: Less than 4 years were required to proceed from the existence of a nuclear powered attack submarine (SSN) in 1957 (the *Nautilus*, commissioned in 1955, was the first SSN and itself took less than 5 years to complete) to be deployed fleet ballistic missile boat (SSBN) in November 1960. Indeed, by the end of 1960, 4 years after initiation of the Polaris project, 2 SSBN's were on patrol and 12 were in various stages of outfitting or construction. Major technical accomplishments during that short period included solid fuel missiles with adequate thrust for a 1,200-mile range and the technique for launching missiles from submerged submarines. The hull of an SSN was "cut open" and redesigned in this period to accommodate the 16-tube missile mid-section. The entire nuclear submarine revolution from the 1949 go-ahead given by the Chief of Naval Operations for the *Nautilus* to the deployment of the first Polaris SSBN boat in 1960 required only 11 years. The SUM system involves nothing like the major technological advances made in developing nuclear submarines and solid fuel SLBM's. SUM is merely a realization of a concept presented in the STRAT-X study of 1967: encapsulated missiles as in the MX racetrack basing, secure $C^3$, good guidance accuracy, and integrated crew functions. It is a substantial change in operational concept, relying on large fuel cell propulsion systems, but only a modest advance in technology, including radio inertial guidance improvements. The allegation that SUM could be available only by the 1990's is not only unsubstantiated by analysis, it denies the capacity for our industrial and defense establishments to respond in a timely fashion to national needs. It is reported[5] that the first response to the challenge to deploy missiles at sea was also that initial deployment would require 10 years. (I am referring here to the original Navy proposal in the fall of 1955 to deploy a modified liquid-fueled Jupiter missile; it projected 1963 as the date for the first submarine launch of the missile and 1965 for initial SLBM deployment.) We proved then that with determined and committed leadership we can do much better. Is there no hope now? The SUM challenge is a very very much more modest one than Polaris!

3. "SUM must operate in deep waters as a short range submarine with no apparent advantage over conventional submarines such as Trident. Therefore, substituting SUM for MX would represent an abandoning of the Triad in favor of a Dyad of bombers and submarines, not the creation of a Quadrad."

Here again there is no analytic basis provided for this assertion. There are major differences between the SUM and Trident with respect ASW. These are both operational differences and differences in the observables between small electric powered boats, each displacing 1,000 tons, and high-speed and much larger nuclear powered boats, displacing 18,000 tons. The major operational ones include the very much larger number of boats (typically 40 to 80 depending on whether 4 or 2 MX's are deployed per submarine) which gives the SUM deployment an advantage against any threat involving continuous trailing. Moreover, the proximity to U.S. shores need not and should not provide a benign operating environment for Soviet ASW forces. On the contrary, this deployment area makes it easier to deploy U.S. naval assets more extensively and aggressively against Soviet ASW threats. The physical advantages for the SUM deployment include the fact that the SUM boats are much quieter because of their electric drive propulsion, their much smaller size, and their much slower operating speeds. To quote a senior defense official with Secretary of Defense Harold Brown on his trip to China (see New York Times, January 12, 1980):

"Diesel-electric [are] quieter than nuclear submarines and harder to detect."

Furthermore, the shallow operating depths and near coastal waters of the SUM deployment[6] are, in general, a more complex operating medium for ASW relying on acoustic observables; these are the only effective ones at present. Moreover, the more limited SUM deployment area can be filled with noise by sound generators, thereby raising the background noise level and making the quiet submarines even more difficult to find (although it should be remarked that diesel submarines are currently impossible to detect). It is crucial to perform detailed studies and model analyses of the operational value of these SUM differences from Trident.

## CONCLUSION

The choice of a basing mode for the new MX missile is a very major decision that will shape the U.S nuclear deterrent through the rest of this century. The

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[5] "The Polaris System Development: Bureaucratic and Programmatic Success in Government," Harvey M. Sapolsky (Harvard University Press, 1972).

[6] The waters are themselves sufficiently deep that there is no vulnerability of the SUM deployment to the surf zone, or van Dorn effect. Dr. Perry, Under Secretary of Defense for Research and Engineering, testified before the R&D Subcommittee of the Senate Armed Services Committee on Apr. 30, 1980 that there is no such vulnerability of SUM. In view of allegations to the contrary that have appeared in the press, with attribution to senior defense officials, I have appended to this testimony, for the record, a statement of clarification.

United States is inevitably losing an element of simplicity and diversity in its strategic forces as a result of the growing potential vulnerability of fixed land based ICBM's. By moving to the racetrack the United States would be deploying a system that brings with it inevitable and unavoidable operational problems of great difficulty, as I discussed earlier.

In contrast to the racetrack, the SUM system presents a direct, and, I believe manageable, technical challenge to maintain security on the basis of mobility and operational procedures at sea. SUM preserves an important diversity of the U.S. strategic deterrent because its operational procedures, as well as its physical observables, are designed to differ in major ways from the Trident. At present there are no known or foreseeable vulnerabilities of the Trident/Poseidon boats. It is even more difficult to imagine potential threats to a SUM deployment emerging in the future that cannot be neutralized by a combination of technological and operational measures by the United States. As I showed above, the SUM deployment should cost less than the racetrack by $10B or more. Some of this saving could and should be used as needed to further strengthen the U.S. naval capabilities against potential Soviet ASW threats.

Finally, let me say that, as a technical man who has been involved in technical issues of U.S. national security for more than 20 years, I realize that it is not always possible to arrive at a good technical answer to every technical problem. I firmly believe that the long-term national security of the U.S. will be better served by facing the technical challenge of maintaining a survivable water-based system with characteristics similar to SUM than by assuming the difficult operational problems of the racetrack as described above. However, I also believe that it has yet to be established that SUM, as I have described it, is the best solution for the United States to the growing problem of vulnerability of our fixed land based ICBM's. A substantive and serious analysis of the SUM concept including a range of different parameters is urgently needed.

I am confident that, with good technology, we can do better than the seriously flawed MX racetrack basing concept.

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## STATEMENT ON SUM AND ITS INVULNERABILITY TO THE SURF ZONE (VAN DORN EFFECT)

This is written in response to the report in the Washington Post of Wednesday, March 26, that our proposal for deploying the new MX missile on small submarines near the shores of the continental United States, known as SUM, is technically flawed and the submarines are vulnerable to a tidal assault by underwater nuclear explosions. As reported, this claim of SUM vulnerability was made at hearings of the House Subcommittee on Military Construction on Tuesday, March 25, by Under-Secretary of Defense, Research and Esgineering, Dr. William Perry, and his deputy for strategic and space systems, Dr. Seymour Zeiberg.

We have confirmed directly with Drs. Perry and Zeiberg that they recognize no such vulnerability of our proposed SUM deployment. The extensive Defense Nuclear Agency analysis referred to in the Washington Post story is one we are fully aware of. It indicates that in coastal waters of depths less than 400 feet, there would be serious turbulence generated by nuclear detonations further off shore. Known as the "van Dorn effect," or surf-zone effect, this is a phenomenon is which a wave from a massive nuclear explosion, or a coordinated series of explosions, in deep water steepens and increases in height as it reaches the shallow waters of the continental shelf off the East Coast of the United States. The turbulence created by such an artificial tsunami could indeed tumble and destroy submarines in such shallow waters where the depth to the ocean floor is less than, or about, 400 feet. We do not advocate deploying the entire SUM force in such shallow waters. This is clear in our original testimony before the House Armed Services Committee on February 6–7, 1979, and again is explicitly discussed in our letter on this very issue that Senator Hatfield of Oregon presented and introduced into the official Record of the Senate debate on the Department of Defense appropriations for fiscal year 1980 (see Congressional Record—Senate S.16353, November 9, 1979). Quoting from this letter: "We do not advocate deployment of the entire SUM force in such shallow waters. Our proposal calls for deploying this force in coastal strips 200 miles wide in order to distribute the mini-subs over a broad enough ocean area so that the force cannot be barraged at any depth. In particular, the Pacific waters rapidly become deeper than 400 feet beyond a few miles near coast whereas the continental shelf off the Atlantic Coast drops below 100 fathoms or 600 feet within a distance of less than 100 miles from the coast line. There is thus no surf zone problem (van Dorn effect) for the survival of the SUM force although a fraction of the submarines in transit or in port might be destroyed." This fraction—as well as all submarines, including Poseidon and Trident boats, in port—should be considered as potentially vulnerable and not included in the survival deployment.

Vulnerability to the van Dorn effect could exist in at most 20 percent of the original proposed deployed area of 200-mile wide bands off the continental U.S. coast lines. By moving the East Coast deployment further offshort by as much as 100 miles—which would have no significant impact on our basing concept, including its command and control chain, its guidance procedures, and its invulnerability to anti-submarine warfare (ASW)—this concern is totally removed. In these deeper waters, the submarines would still patrol only 200 to 300 feet below the surface so that they would be less vulnerable to attack by nuclear weapons, which for greatest capability against submarines should be exploded deep in the water. We therefore assert that there exists no vulnerability of the proposed SUM deployment to tidal effects and that on this point there is no disagreement between us and the top responsible and knowledgeable defense officials.

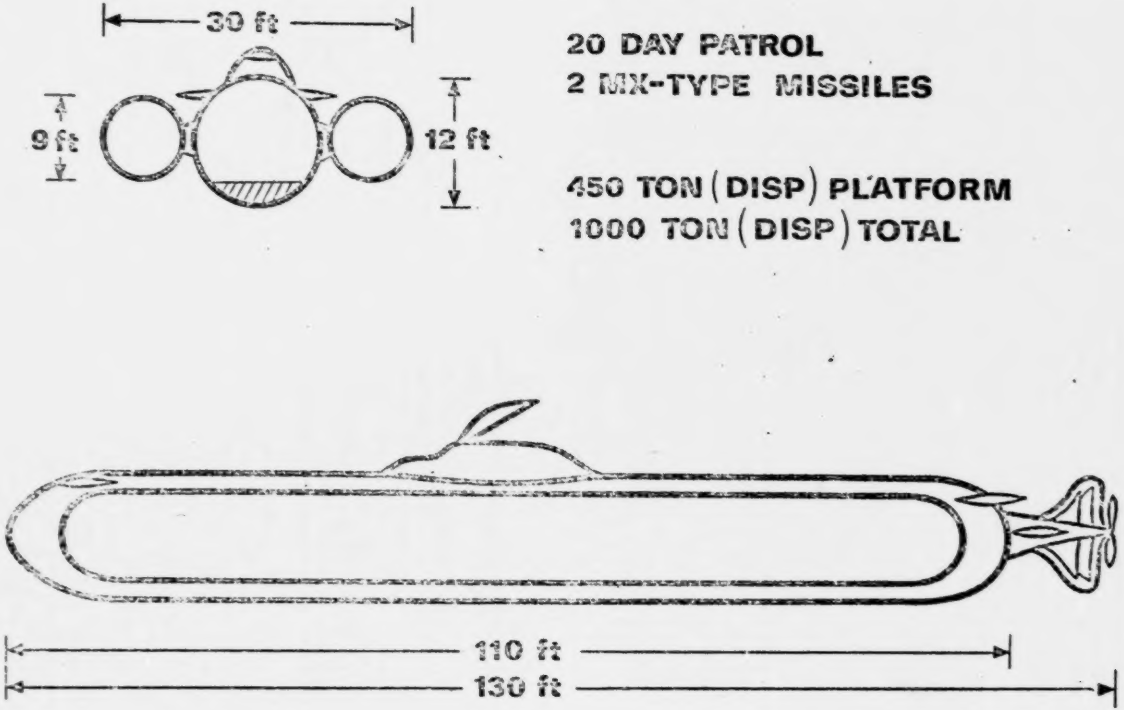
30 ft
9 ft
12 ft
20 DAY PATROL
2 MX-TYPE MISSILES
450 TON (DISP) PLATFORM
1000 TON (DISP) TOTAL
110 ft
130 ft

Fig. 1

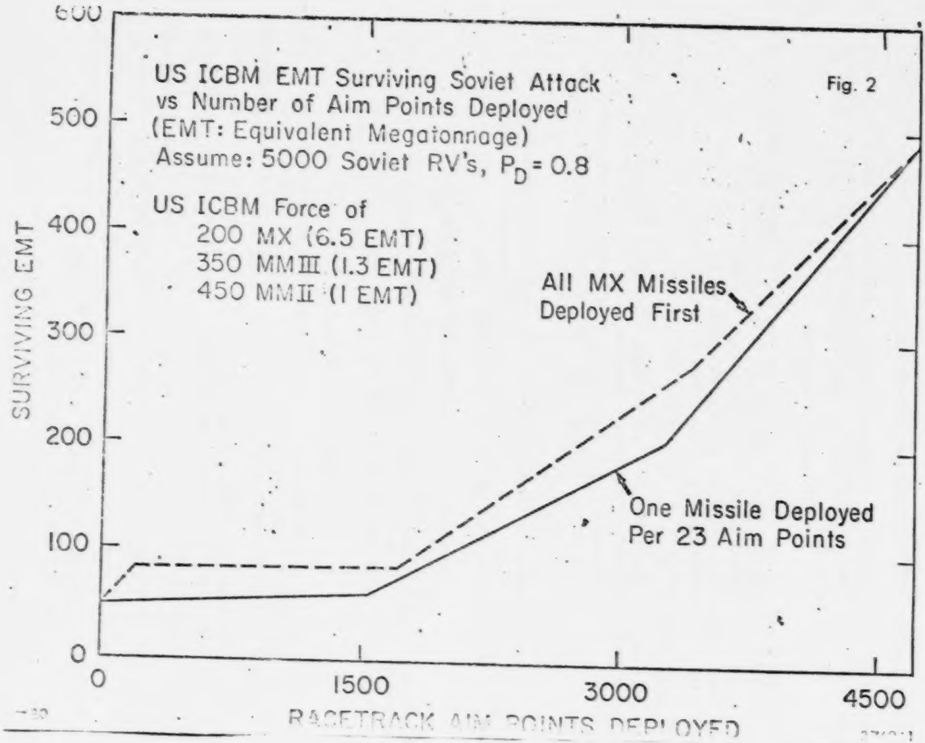
Fig. 2
US ICBM EMT Surviving Soviet Attack
vs Number of Aim Points Deployed
(EMT: Equivalent Megatonnage)
Assume: 5000 Soviet RV's, $P_D = 0.8$
US ICBM Force of
200 MX (6.5 EMT)
350 MMIII (1.3 EMT)
450 MMII (1 EMT)
All MX Missiles Deployed First
One Missile Deployed Per 23 Aim Points
SURVIVING EMT
0
100
200
300
400
500
600
0
1500
3000
4500
RACETRACK AIM POINTS DEPLOYED

## BIOGRAPHICAL SKETCH

### PRESENT POSITION

Lewis M. Terman Professor, Deputy Director, and Executive Head Theoretical Physics, Stanford Linear Accelerator Center, Stanford University, Stanford, Calif.

### PRESENT ACTIVITIES

Chairman, High Energy Physics Advisory Panel, U.S. Department of Energy (formerly AEC and ERDA).

Consultant, U.S. Arms Control and Disarmament Agency.

Consultant, Office of Science and Technology Policy.

Consultant, Office of Technology Assessment, U.S. Congress.

Consultant, Los Alamos Scientific Laboratory.

Consultant, National Security Council.

Member, JASON Division, SRI International (formerly Institute for Defense Analyses) Member of JASON Steering Committee.

Member, Board of Trustees, Institute for Advanced Study, Princeton, N.J.

Member, Board of Governors, Weizman Institute of Science, Rehovot, Israel.

Member, Advisory Committee, MIT Physics Department.

Member, Board of Directors, "Annual Reviews, Inc."

Member, Energy Research Advisory Board, U.S. Department of Energy.

Member, Board of Directors, The Arms Control Association, Washington, D.C.

Member, Council on Foreign Relations, New York.

### PROFESSIONAL AND HONORARY SOCIETIES

American Physical Society (Fellow), Phi Beta Kappa.

National Academy of Sciences, Sigma Xi.

American Academy of Arts and Sciences, Phi Kappa Phi.

### AWARDS AND HONORS

Ernest Orlando Lawrence Memorial Award—1972—for research in Theoretical Physics (Atomic Energy Commission).

University of Illinois Alumni Award for Distinguished Service in Engineering—1973.

Guggenheim Fellowship—1961–62 and 1971–72.

Richtmyer Memorial Lecturer to the American Association of Physics Teachers, San Francisco, California—1978.

Leo Szilard Award for Physics in the Public Interest—1980—presented by the Forum on Physics and Science of the American Physical Society.

### RECENT POSITIONS AND ACTIVITIES

1969–76: Member, Editorial Council, "Annals of Physics."

1966–70: President's Science Advisory Committee.

1960–73: Office of Science and Technoloy, Executive Office of the President, Member (or Chairman) of PSAC Panels on national security problems.

1974–76: Defense Science Board Task Force.

Spring 1975: Schrodinger Visiting Professor, University of Vienna, Austria.

Spring 1971: DuPont Lecturer, University of Pennsylvania.

Fall 1962, 1970: Visiting Professor and Loeb Lecturer, Harvard University.

Winter 1965: AVCO Lecturer, Cornell University.

1971–74: Member: Physics Visiting Committee, Harvard University.

1967–68: Member, National Accelerator Laboratory Physics Advisory Committee.

1966–69: Member, Advisory Council, Department of Physics, Princeton, University (Chairman 1967–69).

Spring 1979: Visiting Fellow, All Souls College, Oxford University.

### PERSONAL DATA

Born September 13, 1926—Atlantic City, N.J.; Married (Harriet J. Stainback, Minter City, Miss.); Children (Daniel W., b. 1953; Persis S., b. 1955; Joanna H., b. 1965).

### EDUCATION

1946 A.B., Princeton University; 1947 M.A., University of Illinois; and 1949 Ph.D., University of Illinois.

### SPECIAL FIELDS

Theoretical Physics: Elementary Particle Physics and Quantum Theory.

### PUBLICATIONS

Three books and numerous papers in theoretical physics.

### EMPHASIS ON SURVIVABILITY

Dr. DRELL. During the past two decades the United States and the Soviet Union have made major efforts to deploy their strategic nuclear forces so that in very large measure they will be immune to the threat of destruction by a pre-emptive strike targeted against them. Survivability is widely recognized to be an important aspect of a deterrent force.

The current buildup of accurately and reliably MIRVed ICBM's by the Soviet Union will significantly reduce the U.S. confidence in the vulnerability of one leg of the U.S. strategic Triad, our fixed land-based ICBM's, during the 1980's.

Loss of the U.S. ICBM force would still leave intact a very robust force of approximately three-fourths of the total number of nuclear warheads in the currently deployed U.S. strategic forces and approximately two-thirds of their total throw weight on our Poseidon/Trident submarines and strategic bombers with cruise missiles.

Nevertheless there still remains a fundamental question. Should the United States simply accept without a response a decrease in margin of safety of the survivability of our strategic retaliatory power as a result of Soviet deployments? The answer given by the U.S. Government is clear; to simply ignore the problem of a growing vulnerability of our Minuteman is not an acceptable policy for the United States.

I agree with this answer; to do otherwise would be harmful to strategic stability. The issue has become not whether but how to respond to the growing Soviet ICBM threat to Minuteman force.

### SUM BASING MODE

I wish to speak of the SUM basing mode. A basing scheme that is survivable and which in major aspects retains the desired characteristics of the current U.S. ICBM force is the proposed small underwater mobile force or SUM.

SUM would deploy small non-nuclear-powered submarines operating in near coastal waters off the east and west coasts of the continental United States. Each submarine would carry several encapsulated missiles horizontally mounted external to its pressure hull.

This concept can be adapted to a wide variety of missiles with ICBM range. I will speak of it here as deployed with the new MX missile now in engineering development.

This sets the scale of the SUM as a submarine of 450 tons loading two MX missiles as illustrated in the chart. Correspondingly, a 1,000-ton pressure hull would carry four horizontally mounted MX capsules.

SUM would be deployed within an ocean band 200 nautical miles wide. This band could extend offshore on the Pacific coastline and on the Atlantic coastline although to stay entirely instead of mostly off the Continental Shelf of the east coast one could begin the deployment as far as 50 miles or so offshore extending out 200 miles.

This provides an ocean operating area that is sufficiently large so that it cannot be barraged by the entire Soviet ICBM throw weight. The number of SUM boats deployed will correspond to the desired level of survivable megatonnage in the U.S. targeting plan. To match that planned for the MX racetrack against a SALT constrained mid-level Soviet threat one would want a force of 80 such boats each loading two MX's or 40 loading four, depending upon the hull size in the final design.

Since they are deployed in near coastal waters the SUM boats need not travel fast nor far to station. They therefore need not and should not be nuclear powered. In particular inexpensive acoustically quiet and state-of-the-art technology fuel cells would remove any need for surfacing and snorkeling.

In addition to the difficulties presented to Soviet antisubmarine warfare or ASW efforts by the very quiet electric drive, SUM presents a very different as well as difficult, targeting problem, since its operating area is close to the United States in waters that are under our direct control and that control can be improved by aggressive operations and more equipment for the U.S. Navy.

Communications with SUM is also easier than with our present farflung deployment of Poseidon/Trident nuclear submarines. Furthermore the submarines would not require a good inertial navigation system of their own but could rely on the missiles' navigation system to locate their positions with precision. Accuracy of the missile would be enhanced by an input from NAVSTAR, the global positioning satellites, or from proliferated ground-based stations that we describe as backup and which could not be targeted.

Crew size could be minimal with typically a crew of 12 to 15 forming four watches of three to four each. The tour of duty would be roughly 3 weeks with the crew serving primarily to monitor equipment, perform routine maintenance and safety checks, and to retain positive control over the missiles.

This tour of duty would be sufficient to insure that the submarine spends a large fraction of the time on station since the patrol area is so near the submarine bases.

The basic U.S. strategy has long been to seek a distribution of forces with different operational and physical characteristics so that the different components of our strategic nuclear deterrent have different potential vulnerabilities and potential failure modes.

The SUM system is consistent with this strategy because its vulnerabilities differ substantially from those of the current SLBM force.

The administration has rejected the possibility of moving to sea as a means of solving the Minuteman vulnerability problem and has recommended instead proceeding with the racetrack basing mode, or the linear basing mode as of this morning, for the MX missile.

They have argued that in the interest of maintaining diversity of the U.S. strategic deterrent the United States should retain a land-based component.

### RACETRACK BASING MODE

The racetrack basing mode is technologically straightforward but presents severe operational and strategic problems aside from political and environmental difficulties that are often raised.

Primary among these problems are the sensitivity of the racetrack deployment to the threat to which it must be sized; the requirement that essentially the entire system must be deployed before there is any gain in surviving megatonnage and the necessity for maintaining high confidence in secrecy, deception and active simulation in the middle of our society. On this last point it's difficult for me to imagine an advantage for the United States with its open society in competing with the closed Soviet society to maintain confidence and secrecy and deception.

The United States would be choosing Soviet home turf for a competition which is almost bound to occur if past Soviet tendencies follow the U.S. lead in weapons programs are a valid guide to the future.

We should prefer to compete with the Soviets on our home turf of mobility based upon new systems and reliable technologies and we have much of this to gain by going to sea. I agree with Admiral Moorer's earlier remarks.

### DOD REJECTION OF SUM SYSTEM

On April 9 the Defense Department issued a report with their analysis of the SUM system. Three conclusions in this report formed the basis for their rejecting the SUM concept.

One. SUM is unlikely to be cheaper than MX; considerable technical advances have to be invoked to make it comparable to cost to MX or Trident type systems.

Two. SUM is unlikely to be available before the 1990's.

Three. SUM must operate in deep waters as a short range submarine with no apparent advantage over conventional submarines such as Trident. Therefore substituting SUM for MX would represent an abandoning of the Triad in favor of a dyad of bombers and submarines not the creation of a quadrad.

### CORRESPONDENCE

I responded to these three criticisms in a letter to Congressman John Seiberling following informal hearings held on April 3 and a copy of that response is enclosed. I hope it will be inserted into the record.

Senator LAXALT. We will insert the letter into the record at this time.

[The letter follows:]

## LETTER FROM SIDNEY D. DRELL

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

The Honorable John Seiberling
House of Representatives
1225 Longworth Office Building
U. S. Congress
Washington, D. C. 20515

Dear Congressman Seiberling:

Thank you for the opportunity to participate with Dr. Garwin in your informal hearing of Thursday, April 3 on the SUM and racetrack basing modes for the MX with Dr. Zeiberg, General Hecker, and other DOD officials and Air Force officers. It was a useful exchange of views. It has also been exceedingly valuable to have had the opportunity, following our meeting, to study in detail the draft of the report, "An Evaluation of the Shallow Underwater Missile (SUM) Concept," dated April 3, 1980 (henceforth referred to as the draft report), prepared by Dr. Zeiberg's office [Office of the Deputy Under Secretary of Defense for Research and Engineering (Strategic and Space Systems)].

I do not believe this draft report provides an adequate basis for the conclusion expressed by Dr. Zeiberg in Thursday's discussion that "there is no particular motivation to be interested in SUM." As the only currently existing DOD report on SUM, it also does not provide a valid basis for the Administration or the Congress to dismiss the SUM basing option. In this letter I wish to provide for the record, as you requested, my response to key statements made in the draft report and by Dr. Zeiberg in last Thursday's discussion which lack an apparent analytic basis. I believe that SUM is a promising option for meeting the growing U.S. concerns about survivability of our fixed land based ICBM's.

First, let me say I was pleased to hear from Dr. Zeiberg directly that the van Dorn, or surf zone effect, is irrelevant to the proposed SUM deployment. I hope we will hear no more of that allegation. I am also interested to hear him say that command, control, and communications ($C^3$) and accurate guidance are not viewed by him as special difficulties or inadequacies of the SUM concept. When we started our JASON study in 1978 these were the two aspects most frequently raised in support of retaining a survivable land based ICBM component of the U.S. strategic deterrent. Indeed, motivated by such concerns, our JASON study efforts of 1978 and 1979 heavily emphasized the development and description of robust $C^3$ and accurate guidance techniques.

I note that these factors are still occasionally raised in some quarters as drawbacks of SUM. For example, the official Air Force response (by Colonel Richard D. Osborn, USAF, Chief, Systems Liaison Division, Office of Legislative Liaison, dated April 1, 1980) to Senator Hatfield's letter of January 29, 1980 to the former Secretary of the Air Force requesting Air Force comments on SUM states: "Operation in deeper water would also diminish the capacity for high confidence $C^3$ and weapon delivery accuracy." As described in our original proposal, SUM is intended to be deployed, for the major part, in deep water in an ocean band some 200 miles wide off the east and west coasts. Its near coastal deployment in these waters was designed specifically to enhance the technical feasibility of robust $C^3$ and of good guidance relying on a ground beacon system as well as on NAVSTAR satellites. This is not changed in our proposal, and it is not evident therefore that the Air Force and the Deputy Under Secretary of Defense for Research and Engineering are in full agreement with one another. On the basis of the ideas developed in the 1978 and 1979 JASON studies, I believe the SUM concept suffers no inadequacies or special difficulties with regard to robust, reliable $C^3$ and good guidance. I have seen no analysis to suggest otherwise. I welcome Dr. Zeiberg's agreement on these particular issues. I suggest that it would be valuable to move ahead with detailed design studies of some of the $C^3$ and guidance ideas advanced in the JASON studies because they may prove to be of substantive value to our Poseidon/Trident forces, as well as to the proposed SUM deployment.

The basic case against SUM is summarized on page 2 of the draft report, which states:

- "SUM is unlikely to be cheaper than MX; considerable technical advances have to be invoked to make it comparable to cost to MX (or Trident) type systems.
- "SUM is unlikely to be available before the 1990's.
- "SUM must operate in deep waters as a short range submarine with no apparent advantage over conventional submarines such as Trident. Therefore, substituting SUM for MX would represent an abandoning of the Triad in favor of a Dyad of bombers and submarines, not the creation of Quadrad."

I searched in vain for an analytic basis for arriving at the second and third of these three conclusions, but found none at all. Concerning the first conclusion about costs, I can only comment that the cost of the MX/racetrack weapon system is itself still, after extensive study, uncertain (see the report by the Comptroller General to the Congress, PSAD-80-29), and too little systems work has been done on SUM to permit it to be costed reliably. As the draft report comments on page 48, "The costs shown for SUM are not of budgetary quality and individual costs must be treated as such." Therefore, it is hard to make any definitive cost comparisons.

However, two observations on costs are relevant. First, let us accept the draft report's design of a fuel cell powered "minimum essential submarine" of 1100-ton pressure hull displacement, loading 4 MX missiles. (This size is scaled by the requirement of a four-week mission duration and may, or may not, turn out to be preferable to our JASON report's "point design" of a 500-ton mini-sub loading 2 MX missiles). This means that 25 boats with 100 MX missiles are required on station in order to reproduce the same survivable megatonnage designed in the racetrack deployment of 200 MX missiles (against the projected Soviet threat as limited by SALT II). Given the minimum maintenance requirements for the small submarines and missile capsules and the fact that they are at all times near to their deployment areas, a force of 40 boats would seem fully adequate. However, the cost comparisons in Table V on page 49 are based on a force of 50 boats - i.e., on the assumption of only 50% duty cycle for the SUM force. This difference translates into a $2B savings in investment, plus operational savings. On the other hand, additional costs for naval equipment and operations as required to counter potential threats to the SUM boats will presumably be incurred, thereby increasing the system costs.

"SUM IS UNLIKELY TO BE AVAILABLE BEFORE THE 1990'S."

Past experience shows that, if we are determined to, we should be able to initiate a SUM deployment well before the 1990's. Let us recall the history of the Polaris project: Less than 4 years were required to proceed from the existence of a nuclear powered attack submarine (SSN) in 1957 (first commissioned in 1955) to a deployed fleet ballistic missile boat (SSBN) in November 1960. Indeed, by the end of 1960, 4 years after initiation of the Polaris project, 2 SSBN's were on patrol and 12 were in various stages of outfitting or construction. Major technical accomplishments during that short period included solid fuel missiles with adequate thrust for a 1200 mile range and the technique for launching missiles from submerged submarines. The hull of an SSN was "cut open" and redesigned in this period to accommodate the 16-tube missile mid-section. The entire nuclear submarine revolution from the 1949 go-ahead given by the Chief of Naval Operations for the Nautilus to the deployment of the first Polaris SSBN boat in 1960 required only 11 years! The SUM system involves nothing like the major technological advances made in developing nuclear submarines and solid fuel SLBM's. SUM is merely a realization of a concept presented in the STRAT-X study of 1967: encapsulated missiles as in the MX racetrack basing, secure $C^3$, good guidance accuracy, and integrated crew functions. It is a substantial change in operational concept, relying on large fuel cell propulsion systems, but only a modest advance in technology, including radio inertial guidance improvements. The allegation of SUM availability only by the 1990's is not only unsubstantiated by analysis, it denies the capacity for our industrial and defense establishments to respond in a timely fashion to national needs. It is reported* that the first response to the challenge to deploy missiles at sea was also that initial deployment would require 10 years. (I am referring here to the original Navy proposal in the fall of 1955 to deploy a modified liquid-fueled Jupiter missile; it projected 1963 as the date for the first submarine launch of the missile and 1965 for initial SLBM deployment.) We proved then that with determined and committed leadership we can do much better. Is there no hope now? The SUM challenge is a very, very much more modest one than Polaris!

"SUM MUST OPERATE IN DEEP WATERS AS A SHORT-RANGE SUBMARINE WITH NO APPARENT ADVANTAGE OVER CONVENTIONAL SUBMARINES SUCH AS TRIDENT."

The differences between SUM and Trident with respect to ASW lie in three factors:

1. SUM is deployed closer to the U.S. shoreline and therefore in waters under more complete control of the U.S. Navy, with more shore-based assets available for operations against potentially threatening activities by Soviet ships.

2. SUM presents many new targets (from 30-40 boats) to tax Soviet anti-submarine warfare assets.

3. The SUM boats are small, move slowly, and can be designed to be very quiet, avoiding particularly noise generation due to pumps, heat exchangers, fast drive shafts, and the like in the current nuclear submarines.

Further analysis of the operational importance and significance of these factors for the SUM deployment relative to Trident is necessary and has been proposed by us. Indeed, the analysis of these issues should be pursued both by interested and qualified contractors and by technical experts (skeptics and enthusiasts). One appropriate mechanism for performing this analysis is the Office of Technology Assessment of the U.S. Congress.

I have additional specific comments on the draft report as follows: Section 2.1 discussed the Continental Shelf Sitter. This was not proposed as the basing for the SUM system because the available deployment area is too limited. This entire issue was clarified in the letter by Dr. Garwin and myself to Senator Hatfield that appeared in the Congressional Record (S16353, November 9, 1979). In particular, we also never proposed to "sit on the ocean bottom."

The discussion of existing diesel electric submarines was presented by SUM proponents as an exemplar and as a possible very rapid option in response to a request by Senator Hatfield. This is not the basic SUM proposal that we are advocating.

It is simply wrong to claim, as the draft report does first on page 2, that "substituting SUM for MX would represent an abandoning of the Triad in favor of a Dyad of bombers and submarines..." The U.S. would still retain a force of some 800 Minutemen under SALT limits.

Finally, let me say that, as a technical man who has been involved in technical issues of U.S. national security for more than 20 years, I realize that it is not always possible to arrive at a good technical answer to every technical problem. I do believe that SUM is a promising basing option that avoids problems inherent in a multiple protective shelter deployment, such as the racetrack, which were emphasized in my letter to you of January 22, 1980 which I submitted as a statement for the record of your subcommittee hearings. However, I also believe that it has yet to be established that SUM is the best solution for the United States to the growing problem of vulnerability of our fixed land based ICBM's. We must do our best - especially in so vital a matter as U.S. national security and in so costly and huge a project where we cannot afford to do otherwise. I am confident that we can do better than the seriously flawed MX racetrack basing concept. I am convinced that the Administration has not been fully responsive to the request by the U.S. Congress that alternatives to a land based multiple protective shelter system be given full consideration. Such an analysis is greatly needed. If there are other implicit political, strategic, or service roles-and-missions issues, aside from straight technical ones, that are of preeminent importance in the ultimate choice of a basing by the U.S., these, too, should be explicitly presented, fully analyzed, and explained in the national discussions.

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* THE POLARIS SYSTEM DEVELOPMENT: BUREAUCRATIC AND PROGRAMMATIC SUCCESS IN GOVERNMENT, Harvey M. Sapolsky (Harvard University Press, 1972)

In the meantime, a judgment must be made as to the desirable pace for proceeding to solve the "Minuteman vulnerability" problem. If it is concluded that it is unacceptable to U.S. national security to further delay a decision on the go-ahead for a new survivable basing system, we still have another option. That is to immediately enhance the Trident force. As Dr. Zeiberg pointed out in our discussion, an additional Trident boat could be deployed by 1986 or 87 if we started on it at this time. This would add approximately 192 survivably based warheads to the U.S. deterrent assuming the deployment of the Trident I missile, although further enhancement of the sea based force with the Trident II is also a possibility in this time frame. Such an increase is comparable to what the entire first half of the racetrack deployment would add to the calculated survivable megatonnage against the Soviet threat as projected under the SALT II limits.

I hope these remarks are of use in your continuing deliberations.

Sincerely yours,

Sidney Drell

Sidney D. Drell
Professor and
Deputy Director

### COST OF SUM SYSTEM

Dr. **Drell.** I would like to add to the arguments presented there. "SUM is unlikely to be cheaper." A review of the costing analysis in the DOD study leads me to conclude they have overestimated the cost of the SUM system by approximately $10 billion. This is based upon a very low figure of availability for the submarines which is unrealistic; and is based upon a basing cost of $6 billion which is three times that they charge against eleven full Trident boats whose total displacement tonnage is greater than the force I am talking about by a factor of two and a half.

My own basing costs are in agreement with Senator Garn's as appeared in the Air Force Journal at the end of January, 1980.

When the operational costs are scaled accordingly and when the idea of SUM to have the precise navigation via the missile's navigation system, about which there is no technical difficulty so that the costly electronic suite put on the SUM boats is appropriately degraded, I come to a figure of $10 billion saving.

I would like to add the cost arguments for SUM are incomplete, as they are also in the DOD analysis and do not provide in my mind a basis solid enough for a decision on cost alone. More work needs to be done. I will defend the figure of a $10 billion savings.

"SUM is unlikely to be available before the 1990's." There is no analytic basis for arriving at this conclusion whatsoever in the report. I would say the report is a rather thin report with very little analytic basis for any of its arguments.

### SUCCESS OF PAST MISSILE SYSTEMS

Past experience has shown that when this country is determined to do something seriously about its national security it can do it on a realistic time scale. You will recall the history of the Polaris project.

It took less than 4 years to take the first *Nautilus* boat design, break it apart and insert a 16-capsule missile midsection, develop a long-range solid fuel missile to go 1,200 miles instead of deploying the Jupiter from the Army design and to develop the submerged pop-up technique. It took less than 4 years to deploy the first 2 boats, and with 12 in building.

It look less than 5 years to go from nothing to the deployed *Nautilus* with a nuclear reactor. I believe those two technical achievements were far greater than what I am speaking of here which is more a difference in operational method than technology.

I think it is a pessimistic extrapolation of the U.S. commitment to national security to say the SUM concept would not be available until the 1990's.

### ADVANTAGE TO SUM SYSTEM

"SUM must operate in deep waters as a short-range submarine with no apparent advantage over conventional submarines such as Trident." These assertions in the DOD analysis lack any analytic basis. The major operational differences between SUM and Trident are that one is speaking of very small boats that are electric powered and that have a displacement of roughly 1,000 tons and not 18,000 tons as with the Trident boat.

These operational differences and the large number of targets give the SUM deployment an advantage against any threat involving continuous trailing.

The proximity to U.S. shores need not and should not provide a benign operating environment for Soviet ASW threats.

The physical advantage for the SUM deployment includes the fact the boats are quieter because of their electric drive propulsion; their smaller size; their slower operating speeds meaning they displace much less water.

A high defense official interviewed in the New York Times while traveling with Harold Brown on his trip to China in January said "Diesel-electric are quieter than nuclear submarines and harder to detect."

Shallow operating depths and near coastal waters are a much more complex operating medium for ASW relying on acoustic observables which are the only available ones.

The deployment areas near the coast can also be filled with noise by sound generators.

### DISADVANTAGES TO LAND-BASED MX DEPLOYMENT

My conclusion is the choice of a basing mode for the new MX missile is a very major decision that will shape the U.S. nuclear deterrent through the rest of this century. The United States is inevitably losing an element of simplicity and diversity in our strategic forces as a result of the growing potential vulnerability of fixed land-based ICBM's.

By moving to the racetrack or the linear racetrack, the United States would be deploying a system that brings with it inevitable and unavoidable operational problems of great difficulty.

In contrast to the racetrack the SUM system presents a direct and I believe manageable technical challenge to maintain security on the basis of mobility and operational procedures at sea and emphasizes our strength as a naval nation as Admiral Moorer mentioned.

SUM preserves an important diversity of the U.S. strategic deterrent because its operational procedures as well as its physical observables are designed to differ in major ways from the Trident. At present there are no known or foreseeable vulnerabilities of the Trident/Poseidon boats.

It is even more difficult to imagine a potential threat to a SUM deployment that would emerge in the future that could not be neutralized by a combination of technological and operational measures by the United States.

### COST EFFECTIVENESS OF SUM SYSTEM

With the $10 billion or more savings we would have more than it costs to beef up our ASW capability precisely to handle the operational problems. Senator Garn in his Air Force Journal article quoted a 10-year operating and investment cost of something like $7.9 billion for ASW forces and I think that is well within the margin of savings.

As a technical man who has been involved in technical issues of U.S. national security for more than 20 years I realize it is not always possible to arrive at a good technical answer to every technical problem.

I firmly believe the long-term national security of the United States would be better served by facing the technical challenge of maintaining a survivable water based system with characteristics similar to SUM than by assuming the difficult operational problems of the clearly flawed racetrack MX basing concept.

Thank you.

Senator LAXALT. Thank you, Dr. Drell. Dr. Scoville?

## ARMS CONTROL ASSOCIATION

## STATEMENT OF HERBERT SCOVILLE, JR., PRESIDENT, ARMS CONTROL ASSOCIATION

### PREPARED STATEMENT

Dr. SCOVILLE. It is a pleasure to be here and accept your invitation to testify today. I think rather than go through my prepared statement I will pick up some key points in the prepared statements and points which came up in the discussion of the last 2 days. I submit my prepared statement for inclusion in the record.

Senator LAXALT. It will be inserted in the record at this point.

[The statement follows:]

## PREPARED STATEMENT OF HERBERT SCOVILLE, JR.

Mr. Chairman,

I appreciate very much the invitation to testify before these subcommittees on the subject of the deployment and basing mode for the MX missile. The potential vulnerability of our existing land-based ICBM force is one of the most important security issues which this Government must face in the next decade. There seems little disagreement that in the years ahead the Soviets will acquire MIRV missiles with sufficient warheads, having the yield and accuracy to provide a theoretical threat to the U.S. Minuteman force. But I should like to stress the word "theoretical" because in searching for a solution, this threat must be placed in proper perspective. The Soviet missiles will have warheads with sufficient accuracy and yield so that each will give a high probability of being able to destroy a Minuteman silo, but it is quite another thing for the Soviets to be able to knock out 1000 U.S. ICBMs in a near simultaneous surprise attack. Certainly they could never be confident of being able to achieve success in such an attack.

Furthermore unlike the Russians the United States wisely planned its strategic force on the triad of submarine missiles, intercontinental bombers, and land-based missiles, so as to be secure in the event that one leg became potentially vulnerable. Now that land-based ICBMs will become theoretically vulnerable we should not ignore the wisdom and strength of these past policies. However, it is certainly unsatisfactory to have even one leg of the triad potentially vulnerable, and we should look carefully at programs that will realistically reduce that vulnerability.

In this connection Secretary of Defense Harold Brown stated far better than I can in his Annual Report for FY 1979 that the vulnerability of the Minuteman missiles while of serious concern "would not be synonymous with the vulnerability of the U.S. or even the strategic deterrent." The logic of those arguments is equally applicable today, even though the Soviet forces have become greater since that date.

> "In recognizing that the Minuteman vulnerability problem is a serious concern for us, we also realize that the Soviets would face great uncertainties in assessing whether they would

> have the capability we fear--and still greater uncertainties as to its military or political utility.
>
> "On all the technical judgments--how accurate the missiles are, how reliable, how well the system would work in actual practice, whether they could explode two reentry vehicles on each silo without excessive fratricide, or only one--we, quite properly, are conservative, from our point of view.
>
> "Similarly, the Soviets must make cautious assumptions from their perspective. In particular, they must recognize the formidable task of actually executing (as planned) a highly complex massive attack in a single cosmic throw of the dice.
>
> "Even if such an attack worked exactly as predicted, the Soviets would face great risks and uncertainties.
>
> "First, they would necessarily have to consider whether the US missiles would still be in their silos when the attack arrived, or whether, given our capability to have unambiguous confirmation of a massive attack, we would launch from under the attack.
>
> "Second, and more important, an attack intended to destroy US silos could kill at least several million Americans and would leave untouched at least the alert bombers and at-sea SSBNs with thousands of warheads. The Soviets might--and should--fear that, in response, we would retaliate with a massive attack on Soviet cities and industry. The alleged "irrationality" of such a response from a detached perspective would be no consolation in retrospect and would not necessarily be in advance an absolute guarantee that we would not so respond.
>
> "In any event, any Soviet planner considering US options would know that, besides massive retaliation, the surviving US forces would also be capable of a broad variety of controlled responses aimed at military and civilian targets and proportioned to the scale and significance of the provocation."

I stress the theoretical nature of this threat in order to show that it is not necessary to take precipitate action to deal with it. Instead we must look carefully at all alternatives and not end up by destroying large areas of the United States and spending 100 billion dollars on a system that in the long run won't provide invulnerability and could only lead us closer to a nuclear conflict.

The most satisfactory long-term solution to the problem of ICBM vulnerability would be an arms control agreement which limited the ICBM forces to such low levels that they would not provide even a theoretical vulnerability to our land-based ICBMs. Unfortunately we missed the opportunity to improve our security in this way by our failure to seek seriously a limitation on MIRVed ICBMs in SALT I. Now we are paying the price for having chosen the arms race rather than arms control route to security. As many predicted at that time, the Soviets went ahead with their MIRV missile program, some five years behind the U.S., and now we can see clearly a potential threat to our ICBMs in the 1980s. Once MIRV missiles were developed and deployed and the requisite accuracy achieved, it has become much more difficult to turn the clock back. SALT II would have been useful by putting an upper bound on the number of Soviet warheads, but by itself it would not have prevented the Soviet Union having sufficient numbers of accurate warheads to threaten our Minuteman force. The prospects for early ratification even of SALT II are not promising and for more restrictive arms limitations with lower ceilings even less so. The notion that we can pressure the Soviets into favorable negotiations to limit counter-silo weapons by proceeding with our own counter-silo MX is only to follow the misguided course that got us into the current predicament. This was the excuse given to justify going ahead with our MIRV programs in 1970. Let's not make the same mistake another time and end up in 1990 in a still less secure position.

Nevertheless, at the moment, while continuing to try, we cannot rely on arms control to deal with the vulnerability problem. Unfortunately there is no good weapons solution which can provide continued invulnerability of land-based missiles. Apart from its exorbitant costs not only in dollars but also in resources in the area in which it will be deployed, the greatest weakness of the "race track" deployment scheme, or for that matter any other multiple launch point scheme, is that it is open-ended. It depends for its effectiveness on the Soviets not having significantly more warheads than the U.S. has shelters or hardened launch points. It will doom us to a neverending race between Soviet warheads and U.S. missile launch points. Without a SALT II Treaty and its provisions assisting verification, we may not even know how many warheads the Soviets will have. Thus we will be racing blindfolded and never know when we have reached the finish line. Worst case analyses will continue to drive the competition to higher and higher levels. ABM defenses of the multiple launch point bases, while technically helpful, are not the solution since they can only open the door to Soviet ABM systems that would make not only the land-based ICBM leg of the triad but also the SLBM leg unreliable deterrents.

In searching for alternatives we need a non-targetable missile deployment scheme which does not give the Soviet Union the option of overwhelming it simply by adding warheads. I believe that the proposal to use small submarines operating relatively close to the U.S.

coasts offers the best promise of any system that I have heard about. I will not go into details on this system since I believe others on this panel, who are better qualified, will be doing so. Suffice it to say that these submarines should operate in water deep enough to avoid vulnerability to the van Dorn tidal wave effect. This can be achieved by moving a few miles off the west coast and one to two hundred miles off the east coast. The submarines could carry externally two or possibly four encapsulated MX missiles, but I personally would prefer the already available Trident I missile. I have not heard any persuasive arguments that the MX is necessary under these circumstances and the Trident I would certainly be much cheaper and available much sooner. The force size would be selected to be able to have 100 missiles operational at sea at all times. The advantage of two missiles per ship would mean that the Soviets would have to destroy 50 targets simultaneously, but this would probably be a more expensive system than if only 25 submarines with four missiles were deployed.

These mini-submarines, unlike existing Polaris-Poseidon and future Trident ones, could have much more certain communications with land and therefore avoid the command and control weaknesses of the wide ocean submarine systems. Guidance corrections can be provided after launch from satellites or nearby ground beacons so that the warheads can have accuracy as good as land-based missiles. The submarines could return to port for crew changes and maintenance, but the concept of using tenders for most servicing in place appears attractive and should be thoroughly explored.

It is very important that the design concept for these submarines should be dominated by the desire for simplicity. There must be no gold plating, no unnecessary frills, no unnecessary characteristics. The managers of the system must be made to toe the line by the administration and the Congress. If it does, I am convinced that these submarines can be built rapidly and cheaply.

The most important strategic feature of this proposed submarine system is that it is untargetable. Submarine locations will be unknown, and they can operate in an area of approximately 1/2 million square miles so the fleet cannot be subjected to barrage attacks. There will be no race between Soviet warheads and submarines. The system does not become vulnerable as the Soviets increase the number of their warheads, and therefore it is not dependent on continued arms limitations to maintain its effectiveness. Unlike the openended multiple launch point land-based systems, it is a closed, finite size system. Furthermore the overall vulnerability of our strategic forces will be lowered the day the first submarine goes to sea. We do not have to reach the point where we have as many launch points as the Soviets have warheads before any improvement in the survivability of our strategic deterrent is obtained. Thus even if the first submarine does not go to sea until the end of the 1980s, our security will be no worse off than with the "race track" scheme, which will at the earliest only match Soviet warheads by about 1990. The finite nature of the mini-submarine system for assuring invulnerability as opposed to the openendedness of the multiple launch point schemes makes it certain that in the long run the submarine system will be less costly.

The mini-submarine system can be designed in such a way that unlike the land-based MX it cannot be construed by the Soviets as a first strike system. While the MX, or for that matter other types of missiles, launched from these mini-subs could be given the accuracy necessary for a counter-silo capability by supplying final guidance corrections to the missile after launch, the force as a whole could not be viewed as a threat to the entire Soviet ICBM force. Since the submarines would be untargetable, it would not be necessary to have significantly more than 100 missiles deployed in order to be sure that at least 100 would survive for a retaliatory attack. Even if each missile had 10 warheads, the total force would have only 1000, an insufficient number to provide a first strike threat against the force of 1400 Soviet ICBMs. Thus while the missile could have a hard target capability, the force would not have a destabilizing counter-silo capability, and therefore would not increase the risk of a nuclear conflict breaking out.

The submarine system also has the advantage that the missiles will not be deployed on U.S. soil and will not attract a Soviet attack on the U.S. people. If a conflict does break out with an attack against our missiles, it will not inevitably produce the widespread radioactive contamination of the countryside that would occur if our missiles were on land. Deployment at sea will also avoid the problems of land use that the "race track" scheme is now raising in Nevada and Utah. The Air Force has claimed that it will maintain security only immediately around the 4600 shelters (25 square miles), but this is patently dishonest. Will the Air Force really allow cattlemen, miners, campers, and others free access to the 40,000 square mile area when the success of the plan depends on deceiving the Russians? Live nuclear warheads and their fissionable material also require stringent protection again terrorist attacks. With submarines there will be no social or environmental impacts on the communities in that area.

The number of such submarines that are procured can be verified during the production and fitting out stage in the same way that larger submarines are verified in SALT today. Thus were the Soviets to adopt a similar program we could verify the size of their force. This is in direct contrast to the multiple launch point schemes, since Soviet versions thereof will almost certainly be unverifiable. This characteristic is important to our security in the absence of any SALT Treaty as well as if one exists.

Finally, the mini-submarine system has been criticized because it erodes the policy of maintaining a triad of strategic delivery vehicles. The diversity in strategic forces provided by the triad of Polaris/Poseidon SLBMs, the land-based Minuteman ICBMs and the long-range bombers soon to be equipped with cruise missiles has proven an important element in the continued security of our deterrent as a whole. Now that the land-based missile component is becoming theoretically vulnerable in the 1980s, that leg is shaky, but there is no cause for panic since the other two components of this triad provide a more than adequate deterrent. The Soviets, on the other hand, are in a much more dangerous position since they unwisely put 70% of their forces in land-based ICBMs, which are now becoming vulnerable. Our past decision to procure this triad, which was probably more evolutionary than planned, was a sound one.

The mini-submarine system will continue to supply the needed diversification of strategic forces since it will incorporate many of the good characteristics of the land-based missiles and have quite different characteristics from the missiles in the Trident and Polaris ocean submarines. Most importantly it presents the Soviets with new and different anti-submarine warfare (ASW) problems from those they would have to face to threaten the Tridents. Thus the mini-submarines would be quieter, smaller, and located near our coasts, which makes their protection easier and a Soviet attack much more difficult. It has been claimed that our advancing ASW technology might permit us to threaten the Soviet submarine missile force in the 1990s so we must assume that our submarines would also become vulnerable in that time period. This simplistic mirror imagery of Soviet capabilities is always a dubious intelligence approach, but in this case it is not realistic. Even were the Soviets to have as sophisticated technology as the U.S. - which they do not - , their geographic problems are quite different. We have much greater control of the Atlantic waters, which is needed to emplace sophisticated acoustic systems. Further, if the ASW threat were real, all the more reason to develop the small submarines to operate near our coasts where it would be much easier to counter Soviet ASW.

Furthermore, this new submarine missile system can have an accuracy equivalent to the land-based MX and tight command and control, a weakness in current larger submarines. The only significant difference from the MX missiles on land will be that the mini-submarine missiles cannot be located and are thus not targetable so that their potential vulnerability is much less. Diversity in strategic forces will be maintained even though two legs of the new triad will be at sea. There is nothing sacred about a triad which requires one leg to be on land, one at sea, and one in the air; it is the invulnerability of the deterrent as a whole that must be maintained. The mini-submarine missile force does this.

In conclusion the mini-submarine appears to be the most promising approach toward maintaining the assured invulnerability of our missile forces in the 1990s and beyond. It does not have the fatal flaw of the "race track" or any other multiple launch point basing scheme of dependence on outstripping the number of Soviet warheads. It is verifiable and therefore it does not preclude future limitations on strategic arms. It is time to begin now on a priority basis detailed studies of such a missile system. The longer the delay in starting, the longer the delay in achieving the important improvements to our security that this system potentially provides and the greater costs in wasted dollars and devastated western lands.

## BIOGRAPHICAL SKETCH

Born - March 16, 1915, New York, N.Y.

B.S. - Yale, 1937
Graduate work in Physical Chemistry, Cambridge University, England, 1937-39
Ph.D. - Physical Chemistry, University of Rochester, 1942

### Professional Positions:

| | |
|---|---|
| U.S. Arms Control & Disarmament Agency - Assistant Director, Science and Technology | 1963 - 1969 |
| Central Intelligence Agency - Assistant Director for Scientific Intelligence; Deputy Director for Research | 1955 - 1963 |
| Department of Defense - Technical Director of the Armed Forces Special Weapons Project | 1948 - 1955 |
| Atomic Energy Commission, Senior Scientist, Los Alamos Contract | 1946 - 1948 |
| National Defense Research Committee - Variety of research contracts related to chemical warfare | 1941 - 1945 |

### Other Positions:

| | |
|---|---|
| Arms Control Association, Washington, President | 1979 - |
| Council on Foreign Relations Discussion Group on SALT II, Chairman | 1972 - 1978 |
| New Directions, Board Member | 1977 - |
| Council for a Livable World, Board Member | 1978 - |
| Center for Defense Information, Board of Advisors | 1975 - |
| Atomic Energy Commission, Advisory Committee on Nuclear Materials Safeguards | 1970 - 1972 |
| U.S. Delegations to Japan, Australia, South Africa, and Portugal to interpret the Non-Proliferation Treaty, Chairman | 1967 - 1968 |
| U.S. Delegation, NATO Disarmament Experts' Meetings, Chairman | 1966 - 1968 |
| U.S. Delegation to the Geneva Conference of Experts to Study the Possibility of Detecting Violations of a Possible Agreement on the Suspension of Nuclear Tests | 1958 |
| Air Force Science Advisory Board | 1955 - 1962 |
| President's Science Advisory Committee, Consultant | 1957 - 1963 |
| Americans for SALT, Advisory Council | 1978 - |
| Council A.A.A.S. | 1979 - |

### Selected Publications:

Missile Madness - co-author with Robert Osborn, Houghton Mifflin, 1970.
Toward a Strategic Arms Limitation Agreement, Carnegie Endowment, 1970.
Verification of Nuclear Arms Limitations: An Analysis, Bulletin of the Atomic Scientists, October 1970.
International Safeguards: Technical Capabilities, Chapter in Non-Proliferation Treaty: Prospects for Control, Willrich & Boskey, 1970.
The Limitation of Offensive Weapons, Scientific American, January 1971.
Beyond SALT I, Foreign Affairs, April 1972.
Missile Submarines and National Security, Scientific American, June 1972.
A New Look at a Comprehensive Nuclear Test Ban, Stanford Journal, Spring 1972.
The Future of the Sea-Based Deterrent, MIT Press, 1973 - Chapters
MIRV Control Is Still Possible, Survival, International Institute for Strategic Studies, March-April 1974.
Flexible Madness, Foreign Policy, Spring 1974.
SALT: The Moscow Agreements and Beyond, The Free Press, 1974 -

Chapter: A Leap Foward in Verification.
Is Espionage Necessary for our Security? Foreign Affairs, April 1976.
Witness before the Senate and House Armed Services and Foreign Relations Committees on Defense Budgets, Strategic Policies, and Arms Control.
Other writings on defense and arms control matters in the New York Times, Los Angeles Times, Washington Post, Christian Science Monitor, New Republic, etc.
The SALT Negotiations - Scientific American, August 1977.
SALT Verification and Iran - Arms Control Today, February 1979.
The Monstrous MX - The New York Review of Books, March 1980.

### RACETRACK SYSTEM A "SHELL GAME" ON PUBLIC

Dr. SCOVILLE. I guess I would like to apologize that in my prepared statement I continuously referred to the "racetrack" as the "multiple protective structure" which the Air Force and the Defense Department was proposing.

The racetrack is really a very effective moving target for those of us who have to deal with it. If in deployment it was as movable and as well concealed as it seems to be today then it might really be effective.

I think what we are seeing is a shell game on the public of the United States rather than a shell game against the Soviet Union.

We heard about the fact the new system was going to save a lot of space and therefore not be such a disaster as far as your two States, Nevada and Utah, in the West. The basic thing that determines the size of the system is the number of launch points or shelters and the separation between the shelters. This determines the size of the system and any really significant change cannot occur just because you put the same number of launch points in a linear as opposed to a closed system. The linear scheme will make it easier to enlarge the system and thus use up more land.

We heard a lot about reduced costs but nobody heard anything about increased costs, at least neither Secretary Brown nor Dr. Perry mentioned these yesterday.

### COST OF SIMULATORS IN SYSTEM

One of the increased costs which has occurred since the $33.8 billion estimate which was made last September is there is now a firm decision to have 4,400 simulators in the system. There has to be one simulator in each shelter. That is clearly going to increase the cost of the system.

I think that will probably more than offset the reduced costs obtained by simplyfing the launcher and erector system.

### DASH CAPABILITY SACRIFICE

There was nothing mentioned about the fact that in order to have this simplified erector system and separating the launcher from the transporter, one is sacrificing dash capability. No longer can one dash in the 15 minutes warning time because you will have to get the transporter to the particular shelter where the missile is otherwise you would compromise the system in advance.

That dash capability has now been sacrificed in order to simplify the system. I am very much in favor of a simpler system but I think one should look carefully at what you are gaining or losing and whether you are really saving any money or saving territory.

### THEORETICAL OR REAL THREAT

The second point I would like to make is there has been considerable discussion about whether this is a theoretical threat or a real threat. There is no question in my mind and there has never been any question in anyone's mind that the Soviet Union would some time in the 1980's, and perhaps now in the early 1980's, have the kind of accuracies and the number of warheads on their ICBM's so that each warhead could have a high probability of knocking out a single hardened missile silo.

I think Dr. Perry misrepresented the situation. It is not that people did not know that capability was coming along, that made us characterize it as thoretical. The real reason for calling this a thoretical threat is as Secretary Brown himself said, there are quite different problems in being able to destroy 1,000 ICBM's in a near simultaneous surprise attack and being able to have confidence that one warhead will destroy a single silo.

He has pointed out there are all kinds of difficulties. I have a quote from his 1979 annual report in my prepared statement.

### RACETRACK SYSTEM

The second point as to the racetrack multiple or any other protective shelter system is that it is fatally flawed because it depends on the Soviets not having significantly larger numbers of ICBM warheads than we would have launch points or shelters. The trouble with this is it does put us into a race with the Soviet Union between warheads and shelters.

Both of you have raised this question over and over again. I did not see that you got a satisfactory answer to this question.

Dr. Perry mentioned that by 1982 the Soviets would have 6,000 ICBM warheads. I believe that is the number he gave yesterday in his testimony. If they can have 6,000 warheads and that is the estimate we think they will have by 1982, I see no reason at all why we would consider it hard for them to have 10,000 warheads 8 years later when the MX racetrack system would be fully operational. One must remember the proposed deployment scheme does not provide any significant increase in invulnerability until the number of shelters essentially approaches the number of Soviet warheads.

### MISSILE CAPABILITY OF SOVIETS

Senator **Laxalt**. What about the question General Graham raised, that economically he did not think that was a realistic scenario?

Dr. **Scoville**. I do not think their having 10,000 warheads is unrealistic at all. As far as having enough fissionable material which was the point he was raising, I happened in my earlier incarnations to have been in charge of intelligence on Soviet nuclear programs. There is no question in my mind they could have enough fissionable material for these numbers of warheads.

Let me give you an unclassified point in connection with this. Back in the 1960's when the Soviets were developing and starting to deploy ABM systems which would have required thousands of warheads and probably in the long run, many more warheads than this, there was no question in our mind that the Soviets would have enough fissionable material then and not 10 years later to supply those warheads.

I believe General Graham, as an intelligence officer at that time, was specifically looking at the Soviet ABM threat at that particular time.

If they can have 6,000 and pay for 6,000 by 1982, I see no reason why they cannot have 10,000 by 1989 which is perhaps the earliest time the

MX system in Nevada and Utah could be truly operational and effective.

### WARHEAD LIMITS UNDER SALT II

Senator Garn. Dr. Scoville, is it not true that under the terms of SALT II, the sublimits allowed far more warheads than what you just said, that they could, in fact, reach 10,000 by 1985 before SALT was ever over?

Dr. Scoville. Not ICBM warheads. The total number of ICBM warheads which is what we are talking about as a threat to our ICBM's because those are the most accurate, the total number of ICBM warheads allowed under the SALT II Treaty was approximately 6,000. I believe that was the reason why we originally selected the 4,600 shelters for the racetrack system.

Senator Garn. With the sublimits on MIRV'ed systems, you could have a total of 12,000 to 15,000 warheads legally under the terms of SALT II.

Dr. Scoville. Not on ICBM's. They were allowed 300 SS–18's with 10 warheads each. They were allowed SS–19's with 6 warheads. There were only 500 more ICBM's allowed to be MIRVed. That is another 3,000. That is a total of 6,000.

### SOVIET WARHEAD CAPABILITY

Senator Garn. You can easily add up to 8,200 ICBM warheads legally under the terms of SALT II. I spent a good deal of time researching it, about 3 years. But I am not going to take the time to debate SALT II with you today.

Dr. Scoville. I will be glad to put those numbers in the record.

[The information follows:]

### Soviet Warhead Capability

Under the SALT II Treaty the Soviets would be allowed the following maximum number of ICBM warheads:

| Number of warheads: | *Missile system* | *Total* |
|---|---|---|
| 313 | SS–18 with 10 warheads | 3,130 |
| 507 | SS–19 or SS–17 with maximum warheads | 3,042 |
| 380 | ICBM's with single warheads | 380 |
| | | 6,552 |

They were also allowed one new type of ICBM with a maximum of 10 warheads. If they replaced all the existing ICBM's with the new MIRV missile, the Soviets could have 8,200 warheads. However, it would be impossible for them to do this before the treaty expired at the end of 1985.

### ALTERNATIVES

Dr. Scoville. I think we need to get the question of alternatives. There seems to be no question that any multiple protective structure system—racetrack, linear, or vertical silos—which depends on using the shell game against the Soviet Union, it seems to me it has the basic fatal flaw that you are in an unending race with the Soviet Union vis-a-vis warheads.

Furthermore, without a SALT agreement and maybe even with, but certainly without a SALT agreement, we will never know how many warheads the Soviets have. Once they test their SS–18's with 20 warheads and their SS–19's with 12 doubling the present number, we will have to assume they have these warheads even though maybe they are only deploying them with 6 and 10.

We will be actually racing them in warheads and essentially blindfolded because we will not know exactly how many warheads they have and we will have to assume they have this total number of warheads.

As Dr. Drell has mentioned, we are in this game of deception with the Soviet Union. We will never be absolutely certain with all the precautions we take and even with simulators that somehow the Soviets have not penetrated the secret of where the actual missile is in this shell game. This will be much more difficult unless the Air Force adopts additional security measures than just putting a fence around the actual shelters in Nevada and Utah.

They are going to have to have some additional security such as checkpoints and inspecting vehicles and checking on people and surveillance of everybody in Nevada and Utah who move in that area to make sure they are not compromising the system.

It is not just a question of the area you put the fence around.

Getting to the alternative systems, the one and overriding advantage which the minisubmarine systems have over the land-based systems—and I fully agree with Dr. Drell and with Admiral Moorer—that the great advantage of the submarine systems is they are untargetable. They do not get you into a race with the Soviet Union with warheads.

It does not matter whether the Soviet Union doubles the number of warheads. The same number of submarines has just as good invulnerability as if they had the number we presently predict they would have.

We avoid that race. It is a finite system. It is a system which starts to give you increased invulnerability the day the first submarine is deployed. Unlike the racetrack or linear systems you do not have to wait until it is essentially all deployed before you can have less vulnerability.

## TRIAD COMPONENTS

I think I would like to go into one other point which has been raised and that is the question of the Triad. It is a very legitimate point and one which needs to be looked at very carefully.

The minisubmarine system has been criticized because it erodes the policy of maintaining a Triad of strategic delivery vehicles. The diversity and strategic forces provided by the Triad or existing Triad of Polaris/Poseidon SLBM, land-based Minuteman ICBM's, the long-range bombers soon to be equipped with cruise missiles, is an improvement and important element in the continued security of our deterrent as a whole.

Now that the land-based missile component is becoming theoretically vulnerable in the 1980's that leg is shaky but there is no reason for panic since the other two components of this Triad provide more than an adequate deterrent.

### SOVIET MISSILE SYSTEMS LAND BASED

The Soviets are in a much more dangerous position since they unwisely put 70 percent of their forces in land-based ICBM's which are now becoming vulnerable. Our past decision to procure this Triad which was probably more evolutionary than planned was a sound one.

### DIVERSIFICATION FROM MINISUB SYSTEM

The minisubmarine system will continue to supply the needed diversification of strategic forces since it will incorporate many of the good characteristics of the land-based missiles and have quite different characteristics from the missiles in the Trident and Polaris oceangoing submarines.

Most importantly it presents the Soviets with new and different antisubmarine warfare problems from those they would have to face to threaten Trident.

Thus the minisubmarines would be quieter, smaller, and located relatively near our coasts which makes their protection easier and a Soviet attack much more difficult.

It has been claimed that our advancing ASW technology might permit us to threaten the Soviet submarine missile force in the 1990's so we must assume that our submarines would also become vulnerable in that time period.

This simplistic mirror imagery of Soviet capabilities is always a dubious intelligence approach but in this case it is not realistic. Even were the Soviets to have as sophisticated ASW technology as the United States—which they do not—their geographic problems are quite different.

We have much greater control of the Atlantic waters which is needed to emplace sophisticated acoustic systems. If the ASW threat were real all the more reason that we should go ahead and develop larger numbers of small submarines to operate near our coasts where it would be much easier to counter Soviet ASW.

Furthermore this new submarine missile system can have an accuracy equivalent to the land-based MX and tight command and control, a weakness in current larger submarines. The only significant difference from the MX missiles on land will be that the minisubmarine missiles cannot be located and are thus not targetable so that their potential vulnerability is much less.

Diversity and strategic forces will be maintained even though two legs of the new Triad will be at sea. There is nothing sacred about a Triad which requires one leg to be on land, one at sea, and one in the air. It is the vulnerability of the deterrent as a whole that must be maintained.

I believe that the minisubmarine missile force can do this.

In conclusion, the minisubmarine appears to be the most promising approach toward maintaining the assured invulnerability of our missile forces in the 1990's and beyond. It does not have the fatal flaw of the racetrack or any other multiple-launch-point-basing scheme of dependence on outstripping the number of Soviet warheads.

It is verifiable and therefore it does not preclude future limitations on strategic arms.

It is time to begin now on a priority basis detailed studies of such a missile system. The longer the delay in starting, the longer the delay in achieving important improvements to our security that this system potentially provides and the greater costs in wasted dollars and devastated Western lands.

Senator LAXALT. Thank you, Dr. Scoville. Captain Draim?

### FORMER MANAGER, NAVY RESEARCH AND DEVELOPMENT

## STATEMENT OF CAPTAIN JOHN E. DRAIM, USN (RETIRED), FORMER NAVY RESEARCH AND DEVELOPMENT MANAGER

### HYDRA LAUNCH

Captain DRAIM. Thank you, Mr. Chairman.

Before summarizing my prepared statement, which I will insert in the record, I would like to show a very short movie which shows you what a floating launch is. It is different from our Polaris/Poseidon launch in that it uses a buoyant rocket rather than a rocket that is actually fired through the water.

### PREPARED STATEMENT

Senator LAXALT. Your prepared statement will be placed in the record at this point after which you may give the audiovisual presentation.

[The statement follows:]

## Prepared Statement of Capt. John E. Draim, USN (Ret.)

JUST TWENTY YEARS AGO, OUR COUNTRY POSSESSED A SUPERIORITY IN NUCLEAR WEAPONS SECOND TO NONE. WE AND OUR ALLIES CONDUCTED OUR AFFAIRS WITH A SENSE OF UNITY AND SECURITY, CONFIDENT IN OUR MILITARY CAPABILITIES. NOW, IN 1980, WE ARE STRUGGLING MERELY TO MAINTAIN A BARE SUFFICIENCY WITHIN THE CONSTRAINTS OF OUR ECONOMY. WE ARE BEING SQUEEZED BETWEEN INCREASING DEFENSE REQUIREMENTS AND THEIR ESCALATING COSTS (BOTH HARDWARE AND MANPOWER). ALSO, SUPERIMPOSED ON THE NATIONAL BUDGET ARE URGENT DEMANDS FROM OTHER SECTORS FOR GREATER ALLOCATIONS OF THE GROSS NATIONAL PRODUCT. THE SALT NEGOTIATION PROCESS, IN ATTEMPTING TO ACCOMMODATE TO THIS DILEMMA, HAS SET NUMERICAL LIMITS ON WEAPON RELATED ITEMS WITHOUT AN ADEQUATE DEFINITION OF THE TECHNICAL TERMS. FURTHER, IT IS NOW ASSUMED AS AXIOMATIC THAT ANYTHING WHICH UPSETS THE SECURITY OF ONE POWER CONTRIBUTES TO THE INSECURITY OF THE OTHER POWER (THE OLDER, CLASSIC, RULE HOLDS THAT SECURITY IS DIRECTLY RELATED TO MILITARY STRENGTH). THE NEWER AXIOM IS PARTICULARLY DANGEROUS WHEN THERE EXIST UNRECOGNIZED ASYMMETRIES IN WEAPONS DESIGN FEATURES OR CONCEPTS OF EMPLOYMENT. AS ONE EXAMPLE, NUMERICAL LIMITS IN BOTH SALT I AND SALT II ARE BASED NOT ON THE MISSILES THEMSELVES, BUT ON THE SUPPOSEDLY VERIFIABLE ITEMS CALLED "LAUNCHERS"-- THE STRUCTURAL DEVICES WHICH HOLD A MISSILE IN POSITION FOR FIRING. SUPPOSE FOR A MOMENT THAT LAUNCHERS ARE REQUIRED IN OUR OWN MISSILE SYSTEMS BECAUSE OF THE DESIGN CONCEPT ADOPTED AT THE OUTSET OF THE PROGRAM, BUT THAT OUR OPPONENT HAS DEVISED A SYSTEM WHICH DOES NOT REQUIRE A LAUNCHER-- THUS CREATING A "LOOPHOLE" OR A WAY AROUND THE TREATY. THIS VERY POSSIBILITY WAS DISCUSSED IN THE SENATE SALT II HEARINGS LAST SUMMER UNDER THE TOPIC HEADING "MISSILES WITHOUT LAUNCHERS". SPECIFIC REFERENCE WAS MADE TO THE FLOATING LAUNCH MISSILES YOU SAW IN THE MOVIE.

MY STUDIES OF SOVIET SUBMARINE LAUNCHED BALLISTIC MISSILES OVER THE PAST FIFTEEN YEARS HAVE PROVED CONCLUSIVELY TO MY SATISFACTION THAT THESE LIQUID PROPELLANT MISSILES ARE IN FACT HYDRA MISSILES. THAT IS, THEY EMPLOY THE VERTICAL FLOATING, HYDRA LAUNCH TECHNIQUE FOLLOWING THEIR BUOYANT ASCENT FROM THEIR SUBMERGED SUBMARINE. THESE SAME SOVIET MISSILES COULD EASILY BE TRANSPORTED AND DEPLOYED BY ANY NUMBER OF OTHER PLATFORMS SUCH AS SURFACE SHIPS, OR BY MERELY ROLLING OR SLIDING THE MISSILE INTO THE WATER FROM A BARGE OR PIER. THESE METHODS COULD BE DONE WITH A HIGH DEGREE OF DECEPTION AND CONCEALMENT. THEY WERE ALL DEMONSTRATED BY THE U.S. NAVY AT POINT MUGU IN THE EARLY 1960'S.

IF WE FAIL TO RECOGNIZE THE SOVIET USE OF FLOATING LAUNCH MISSILES, THEY COULD BE CONSTANTLY AND QUIETLY IMPROVING THEIR RELATIVE STRATEGIC POSITION BY KNOWINGLY EXPLOITING THIS AMBIGUITY, OR LOOPHOLE. MEANWHILE, WE WOULD BE LULLED INTO A FALSE SENSE OF SECURITY BY ASSUMING THAT OUR INTERPRETATION OF TREATY TERMS IS THE SAME AS THE SOVIETS. SUCH AN IMPROPER ASSESSMENT OF THE OTHER SIDES' SYSTEMS COULD EASILY LEAD US INTO DEVOTING AN EVER LARGER SHARE OF OUR SHRINKING DEFENSE BUDGET INTO FORCE MODERNIZATION CONCEPTS WHICH ARE BOTH STRATEGICALLY UNSOUND, AND UNNECESSARILY COSTLY. IT IS NOT AN EXAGGERATION TO SAY THAT OUR VERY SURVIVAL AS A FREE NATION COULD BE PLACED IN JEOPARDY.

IT IS GENERALLY AGREED THAT A NEW MOBILE MISSILE STRATEGIC SYSTEM (MX) IS NEEDED FOR THE DEFENSE OF OUR COUNTRY. THE QUESTION AT HAND IS WHETHER THE

RACETRACK BASING MODE, OR SOME OTHER ALTERNATIVE BASING MODE, SHOULD BE USED FOR THE MX. THIS QUESTION ENCOMPASSES A WIDE RANGE OF ISSUES INCLUDING STRATEGIC, ECONOMIC, SOCIAL, ENVIRONMENTAL, AND SURVIVABILITY CONSIDERATIONS. IN MY OPINION, PROPERLY PLANNED SEA-BASING OPTIONS CAN RESULT IN HIGHLY SURVIVABLE AND MILITARILY EFFECTIVE STRATEGIC SYSTEMS WHICH BYPASS MOST OF THE PROBLEMS PRESENTED BY THE RACETRACK LAND-BASED MODE, AND CAN BE ACTUALLY OBTAINED AT A LOWER COST! THE VERSATILE, HYDRA-TYPE MISSILE, DEPLOYED ON A VARIETY OF SHIPS, SUBMARINES OR OTHER MARINE PLATFORMS, RELIES MORE ON MOBILITY, CONCEALMENT AND DECEPTION FOR ITS SURVIVABILITY, THAN ON THE REPLICATION OF HARDENED CONCRETE SHELTERS WHICH ARE THE HALLMARK OF THE RACETRACK SYSTEM.

IF YOU EXAMINE THE UNCLASSIFIED DOD STATEMENT ON THE MX AND STRATEGIC FORCE MODERNIZATION OF SEPTEMBER 1979, (PAGES 11 AND 12), YOU WILL BE IMMEDIATELY STRUCK BY THE COST AND EXTENT TO WHICH THE PRESENT MX RACETRACK SYSTEM DESIGN IS DRIVEN AND SUBROGATED TO SOVIET APPROVAL. WE ARE DESIGNING THE SYSTEM SPECIFICALLY SO THAT THE SOVIETS CAN BE ASSURED THAT WE ARE OPERATING WITHIN THE TREATY LIMITATIONS, WHICH CAN ONLY RESULT IN A DECREASED LEVEL OF FLEXIBILITY FOR OUR SYSTEM. WE SEEM TO BE MORE CONCERNED ABOUT ASSURING THEM (THE SOVIETS) THAT WE ARE NOT "CHEATING", THAN WE ARE IN CREATING THE HIGHLY MOBILE, SURVIVABLE AND AFFORDABLE STRATEGIC SYSTEMS REQUIRED FOR NATIONAL SURVIVAL IN CRISIS SITUATIONS. EVEN WERE THE SOVIETS TO FOLLOW OUR LEAD, WHICH IS DOUBTFUL, AND EMPLOY A LAND BASED RACETRACK SYSTEM SIMILAR TO OUR PROPOSED MX SYSTEM, THERE ARE NO ASSURANCES THAT THEY WOULD NOT PURSUE SIMULTANEOUSLY, A COVERT AND DIFFICULT-TO-VERIFY HYDRA MISSILE PRODUCTION AND DEPLOYMENT.

LET US EXAMINE THE MISSILE CURRENTLY PROPOSED FOR OUR OWN MX SYSTEM. TAKING THE WEIGHT AND DIMENSIONS GIVEN IN THE UNCLASSIFIED DOD STATEMENT OF MARCH 1980, ITS SEA WATER SPECIFIC GRAVITY IS FOUND TO BE VERY CLOSE TO ONE. WITH PROBABLY NO STRUCTURAL MODIFICATION, AND LITTLE MORE THAN WATERPROOFING AND PROVISION OF A LITTLE ADDED BUOYANCY, THE MX MISSILE ITSELF IS, IN MY OPINION, CAPABLE OF A WATER LAUNCH. NEWER TYPES OF GUIDANCE SYSTEMS, WELL WITHIN THE CURRENT STATE-OF-THE-ART, ARE CAPABLE OF PROVIDING TO SUCH A FLOATING-LAUNCH MISSILE, ACCURACIES EQUAL TO THOSE ATTAINABLE WITH PRESENT LAND-BASED SYSTEMS. OTHER TYPES OF MISSILES COULD ALSO BE MODIFIED FOR WATER LAUNCH. IN THE EARLY 1960'S, THE POLARIS, THE MINUTEMAN, AND NASA'S SCOUT BOOSTER WERE ALL THE SUBJECT OF PROJECT HYDRA STUDIES AIMED AT CONVERTING THEM TO A FLOATING LAUNCH.

THE STATED DOD POLICY OF PROLIFERATING THE NUMBER OF SHELTERS IN THE MX RACETRACK SYSTEM IN ORDER TO COUNTER AN INCREASED NUMBER OF ENEMY NUCLEAR WARHEADS IS DEFINITELY NOT THE SORT OF RACE WE SHOULD ENGAGE IN. IT WOULD BE AS THOUGH WE WERE PRODUCING 23 HOLSTERS FOR EVERY GUN, WHILE THEY (USING LAUNCHERLE HYDRA-TYPE MISSILES) WOULD BE PRODUCING 23 GUNS FOR EVERY HOLSTER! THESE SOVIET MISSILES, MOREOVER, WOULD BE CONSTANTLY ON THE MOVE, DEPLOYED BOTH OVERTLY AND COVERTLY OVER MOST OF THE EARTH'S SURFACE, WHILE OUR OWN RACETRACK MX MISSILES WOULD REMAIN CONSIGNED TO THE 4600 PIN-POINTED LOCATIONS (KNOWN TO THE SOVIETS AND TO ANY OTHER POTENTIAL ENEMY). THIS LITERALLY INVITES A PRE-PLANNED PREEMPTIVE FIRST STRIKE MOUNTED BY THEIR MORE MOBILE, MORE NUMEROUS, AND MORE SURVIVABLE MISSILES.

I WOULD LIKE TO SUMMARIZE BRIEFLY THE ADVANTAGES OF THE FLOATING-LAUNCH

MISSILE, BASED ON BOTH SYSTEMS CONCEPT STUDIES AND ON ACTUAL HARDWARE EXPERIMENTS WITH FULL SIZE BOILERPLATE MISSILES AND OPERATIONAL SOUNDING PROBE ROCKET SYSTEMS.

FIRST: THERE ARE AN UNLIMITED NUMBER OF "LAUNCH PADS" AND AN INFINITE COMBINATION OF "RACETRACK PATTERNS" AVAILABLE AT MINIMUM COST USING THE OCEANS, INLETS, RIVERS AND LAKES OF THE WORLD, USING THE FLOATING LAUNCH TECHNIQUE. AS A MILITARY BY-PRODUCT, VIRTUALLY UNLIMITED SALVO, OR SIMULTANEOUS, LAUNCH IS PRACTICAL. THE MILITARY STRATEGIST WHO IS AWARE OF THE PRINCIPLE OF CONCENTRATION OF FIREPOWER WILL APPRECIATE THIS CHARACTERISTIC OF THE HYDRA MISSILE. THE COST OF THE HYDRA MISSILE TRANSPORTER VEHICLE OR PLATFORM COULD VERY CONSIDERABLY, DEPENDING ON WHETHER IT WERE A SURFACE SHIP, A NUCLEAR OR NON-NUCLEAR SUBMARINE, OR USED ONE OF THE MORE AUSTERE APPROACHES SUCH AS ROLLING OFF A PIER OR BARGE. THE COST OF THE SEA-BASED TRANSPORTER WOULD HAVE TO BE BALANCED OFF AGAINST THE LAND-BASED (TEL) VEHICLE. BUT, THE SHELTERS AND RACETRACKS ARE ESSENTIALLY FREE FOR THE SEA-BASED SYSTEM -- WHILE VERY EXPENSIVE FOR THE LAND-BASED SYSTEM.

SECOND: USING ANY TYPE OF SEA-BASED SYSTEM, THE TARGETS ON WHICH AN ENEMY IS FORCED TO CONCENTRATE FIREPOWER ARE REMOVED FROM U.S. TERRITORY AND POPULATION. AFTER ALL, IT IS THE PURPOSE OF THE DOD TO PROTECT AND DEFEND THE COUNTRY AND ITS POPULATION. THIS IS BEST DONE BY FORCING AN ENEMY TO EXPEND HIS NUCLEAR FIREPOWER ON HARD-TO-TRACK, HIGHLY MOBILE AND DECEPTIVE TARGETS AT SEA, AWAY FROM OUR SHORES. THE LAND-BASED SYSTEM MERELY DRAWS THE NUCLEAR FIRE TO OUR OWN TERRITORY AND POPULACE. AND, THE MORE WE HARDEN THE SHELTERS, THE MORE WE INVITE THE ENEMY TO INCREASE THE YIELD OF HIS NUCLEAR WARHEADS TO DESTROY THEM.

THIRD: THE FLOATING LAUNCH MISSILE SYSTEM WOULD RELY FOR SURVIVABILITY MORE ON MOBILITY, CONCEALMENT AND DISPERSAL AT SEA -- RATHER THAN ON REPLICATING AND HARDENING LAND-BASED SHELTERS. THE FORMER APPROACH IS DEMONSTRABLY LESS EXPENSIVE. AND, AS ADMIRAL THOMAS MOORER SAYS, "YOU CAN'T LOCATE AND SINK ALL THE SHIPS AT SEA AT 9:33 ON TUESDAY MORNING."

FOURTH: THE CARRIERS FOR SEA-BASED HYDRA-TYPE MISSILES CAN OFTEN BE USED FOR COLLATERAL FUNCTIONS, AS DEMONSTRATED AT POINT MUGU. IN THE CASE OF SURFACE SHIPS, THEY COULD DOUBLE AS RAPID DEPLOYMENT FORCE LOGISTIC SHIPS, OR EVEN AS STRAIGHT CARGO-CARRYING MERCHANT VESSELS. IF THE STRATEGIC MISSILES THEMSELVES BECOME OBSOLETE OR UNNECESSARY, THE SEA-BASED CARRIERS COULD REVERT TO SUCH A USEFUL FUNCTION ON A FULL-TIME BASIS. OBVIOUSLY, THERE IS NO CONCEIVABLE COLLATERAL USE FOR ABANDONED MX SHELTERS AND RACETRACKS OUT IN THE DESERT.

FIFTH: IN A STATE OF HIGH ALERT OR CRISIS, IN A SEA-BASED OPTION, FLOATING TYPE MISSILES COULD BE ACTUALLY DEPLOYED INTO THE WATER TO AWAIT SIMULTANEOUS SALVO FIRING COMMANDS RECEIVED DIRECTLY FROM THE NATIONAL COMMAND AUTHORITY THROUGH AUTHORIZED COMMUNICATIONS CHANNELS SUCH AS TACAMO AIRCRAFT, SATELLITES, OR NEARBY NAVAL UNITS. THE DEPLOYMENT OF HYDRA MISSILES UNDER SUCH CONDITIONS WOULD PRECLUDE PREEMPTION, AND ENSURE DETERRENCE. AS THE CRISIS SUBSIDED, THE MISSILES COULD BE RECOVERED ON BOARD THEIR CARRIERS.

ON A SOMEWHAT DIFFERENT NOTE, I WOULD LIKE TO ADDRESS THE POSSIBILITY OF DAMAGE TO SEA-BASED PLATFORMS DUE TO SEISMIC WAVES GENERATED BY NUCLEAR EXPLOSIONS. THIS DANGER HAS BEEN OVERLY EXAGGERATED, IN MY OPINION. SURFACE SHIPS OR SUBMARINES OPERATING IN THE OPEN OCEAN IN DEEP WATER ARE IN ABSOLUTELY

NO DANGER FROM THIS EFFECT. SUBMARINES ENJOY A GREAT ADVANTAGE OVER SURFACE SHIPS EVEN IN MEDIUM DEPTH WATERS SINCE CIRCULAR WAVE MOTION DIMINISHES RAPIDLY WITH DEPTH, AS ANY SUBMARINE OFFICER KNOWS. AT A DEPTH EQUAL TO THE AVERAGE WAVE-LENGTH, THE CIRCULAR WAVE-MOTION IS ONLY TWO-TENTHS OF A PERCENT OF THE MOTION AT THE WATER'S SURFACE. THE HEIGHT BUILDUP OF A SEISMIC WAVE BECOMES SERIOUS ONLY IN VERY SHOALING WATER WHICH CAN LARGELY BE AVOIDED BY SHIPS OR SUBS EXCEPT WHEN ENTERING OR LEAVING PORT. ALSO, I WOULD CONSIDER IT HIGHLY UNLIKELY THAT ANY NATION WOULD RESORT TO MILITARY USE OF SUCH A RELATIVELY UNPREDICTABLE AND UNCERTAIN SECONDARY KILL MECHANISM AS A TIDAL WAVE.

IN CONCLUSION, IT IS MY OPINION THAT INSUFFICIENT ATTENTION HAS BEEN GIVEN TO ALTERNATIVE STRATEGIC MISSILE SYSTEMS AND LAUNCH TECHNIQUES. I KNOW OF NO RECENT DOD STUDIES ON HYDRA MISSILES HAVING BEEN CONDUCTED FOR THE PURPOSE OF INCREASING OUR STRATEGIC EFFECTIVENESS. MISSILES SUCH AS TRIDENT OR MX COULD BE RATHER EASILY ADAPTED TO THE VERTICAL-FLOATING, HYDRA LAUNCH. THIS COULD BE DONE QUICKLY, AND ONCE DONE, THE RESULTANT MISSILE COULD BE PLACED IMMEDIATELY ON AVAILABLE SURFACE SHIPS OR LOW-COST SUBS. I WOULD STRONGLY RECOMMEND AN IMMEDIATE EFFORT TO DEFINE AND COST-OUT SUCH SEA-BASED OPTIONS. THEY SHOULD BE VIEWED AS SUPPLEMENTAL TO EXISTING SYSTEMS. SYSTEMS BASED ON THE HYDRA TYPE MISSILE CAN BE AVAILABLE QUICKLY AT MUCH LESS COST THAN THE MX RACETRACK. THE EFFECTIVE EMPLOYMENT OF THE FLOATING LAUNCH COULD GO FAR IN INCREASING THE "TOOTH-TO-TAIL" RATIO OF OUR STRATEGIC FORCES — MORE MONEY WOULD BE GOING INTO THE MISSILES THEMSELVES, AND LESS INTO LAUNCHING PARAPHERNALIA.

### MISSILES WITHOUT LAUNCHERS

[An audiovisual presentation was made.]

Senator LAXALT. We do hate to interrupt the movie but we do have a vote. We did have some questions to raise to the panel before we left.

Captain DRAIM. We started this program at Mugu basically to try to cut down on these escalating costs which we are faced with today in much greater degree.

The Senate in the SALT hearings last summer addressed the topic of "Missiles Without Launchers." They were specifically talking about this type of a launch.

My studies of Soviet SLBM's over the past 15 years have proved conclusively that this Hydra-launch in fact is the Soviet type of operation. There is a difference between the Soviet SLBM systems and our own.

The Soviet liquid propellant missiles are in fact buoyant floating missiles. They employ a floating ascent from their submarine and then they are launched in the same manner as you saw the Hydra II missile launched in the movies.

These same Soviet Hydra-type missiles could be just as easily transported by surface ship or barge or merely rolled or slid into the water from a pier. This can be done with a high degree of deception and concealment.

We did demonstrate this at Point Mugu in the early 1960's.

If we fail to recognize this Soviet technique they can essentially use this "launcher" loophole in the SALT Treaty.

### SOVIET HYDRA MISSILES

I would like to point out that this race we seem to be embarking on about producing more shelters than they can produce warheads is extremely dangerous because Soviet Hydra missiles can be produced probably in very large numbers since there is not a lot of extra launch equipment necessary.

I will give you a fixed price contract on these in 1990 dollars and the launcher itself—water—is still going to be zero dollars and zero zero cents.

The Soviet missiles that we are talking about could be produced in very large numbers and if we engage in this race that has been brought up about producing more shelters it would be as though we were producing 23 holsters for every gun—MX missile—while they would be producing 23 guns—Hydra missiles—for every holster. That is not a very good race to be in.

Senator LAXALT. Where does this all fit within the framework of SALT II?

Captain DRAIM. The Hydra missile basically represents the loophole in SALT II. We limit the number of launchers. We do not limit the number of missiles.

As you can see by those movies it is quite easy to launch the missile without a launcher. In fact that is what the Soviets are doing.

Senator LAXALT. It is almost impossible to verify also.

## ADVANTAGES OF FLOATING LAUNCH

Captain **Draim**. I would tend to agree. Let me cover several points on the advantages of the floating launch.

First of all you have an unlimited number of launch pads and also an unlimited infinite combination of racetracks available out over the oceans or any other body of water.

The military byproduct is simultaneous launch or salvo fire. In fact the military strategists will appreciate this concentration of firepower.

Senator **Garn**. I hate to interrupt, we will include all of your statement into the record, but I would like to make a couple of comments. Senator Laxalt and I will both have questions to submit to you for the record. We are sorry the vote has occurred.

Primarily in response to several of the things Dr. Drell and Dr. Scoville have said about cost estimates, and certainly there is not time to get into detailed analysis and questions along that line, but let me say as one who has had problems with racetrack from the beginning, I have problems with the cost estimates for all of the alternative basing proposals, including the racetrack proposal.

I have seen figures come off the top of people's heads. I have seen them change over a period of 3 or 4 years.

## MISSILE COST ESTIMATES

I would just say in general, with all due respect, that I think proponents of SUM are doing the same thing. I have tried very hard to find an analytical base for the conclusions you have presented. Yet, I find just as many loopholes and guesses off the top of the head and out of the air figures in support of SUM as I do in support of racetrack. They are figures that cannot be verified or proven by anyone.

I just wanted to say that, with all due respect, I do not believe any of your or DOD's cost estimates for SUM. I think we will find out both the MX and SUM systems cost a great deal more than any of the estimates we have seen.

I made a comment last fall that I thought MX would end up costing $60 billion. I do not think that will be far off if we go ahead with it. I submit to you, SUM is a lot more expensive than you gentlemen may think it is.

Dr. **Drell**. Senator, this is the first estimate of dollar costs for SUM written by me anywhere. It was based upon taking the DOD study of SUM, their response to SUM and looking at obvious errors in it such as the deployment level of boats; the basing and the electronic suite.

Senator **Garn**. I understand. My major point is on both sides of this argument there are a lot of figures that have to be just plucked out of the air, because there certainly are no engineering design estimates that really make accurate estimates.

Dr. **Drell**. I emphasize in my written statement the need for that and that these numbers are not a basis for a decision. To my mind it is really egregious that after 2 years of thinking about alternative basing that the Defense Department has made no serious study of this alternative. I submit the report issued on April 9 was not responsive to congressional requests for alternative studies and it is not a basis for national decision.

Senator **Garn**. I appreciate your qualification.

Dr. **Scoville**. I have never made an estimate of the costs. I agree with everything you say. I think few of these costs on the MX or racetrack are what are probably realistic costs.

Senator **Garn**. We hear $1 billion here and $1 billion there and pretty soon it adds up to real dollars.

Senator **Laxalt**. Gentlemen, in closing I have one overall impression and that is perhaps the approach of those now over in the Pentagon and otherwise is too much in absolutes.

I have a concern that maybe we are putting too many eggs in the MX basket. Not really enough attention is being given to several of these alternatives including yours. I have a suspicion that you are being waved off and I do not know if that is right.

There is enough basis to warrant some serious examination.

Thank you.

Dr. **Drell**. I agree strongly. I am very pleased to hear you say that.

### SUBMITTED QUESTIONS

Senator **Laxalt**. At this time I will insert into the record a series of questions submitted by Senator Garn and myself.

[The following questions were not asked at the hearing but were submitted for response subsequent to the hearing:]

## QUESTIONS SUBMITTED BY SENATORS GARN AND LAXALT

1. What is your estimate of the maximum at-sea rate of SUM submarines?

In my testimony I made a very conservative assumption of sixty percent for the availability, or the at-sea rate, of the SUM submarines. In view of the inherent simplicity of the system I see no basic reason why this at-sea rate shouldn't grow to seventy-five to eighty percent after operating experience has been gained.

2. Why wouldn't SUM create a dyad of strategic forces, thus foregoing the advantages inherent in the triad?

SUM has very different operating characteristics and physical observables than our current SLBM force of Poseidon/Trident boats. I describe these differences in my formal statement submitted to this Subcommittee. SUM preserves an important element of diversity for the strategic deterrent forces of the U. S. since it has different potential failure modes and vulnerabilities from the current SLBMs. It is these differences and not the fact that SUM is water based that are important. Furthermore the U.S. would not be abandoning all of its ICBMs. Quite the contrary. Having met our requirements for survivable megatonnage with the SUM deployment we could further diversify our deterrent by adapting a portion of our remaining ICBMs to an "arm-after-launch" mode. This would further reduce any possibility of a successful Soviet preemptive strike since the ICBMs thus adapted would be unlikely to remain in their silos after we receive warning of a large scale attack.

3. Could SUM missiles retain the accuracy of MX? Aren't NAVSTAR and ground beacons themselves vulnerable to attack?

The answer to the first question is yes. There are no technical barriers or systems difficulties in achieving high accuracy with the SUM system with the aid of NAVSTAR satellites or of a ground beacon system (GBS). In a full scale nuclear war one might expect that the NAVSTAR satellites would be among the first targets, although it would take several hours to destroy them in their intermediate-altitude orbits. Hence we have proposed the GBS back up so that SUM could achieve high accuracy independent of NAVSTAR. GBS consists of some hundreds of unattended NAVSTAR-like transmitters on U. S. soil near the coastlines. GBS signals could be received by the MX missiles launched from SUM during their boost phase. The missiles will be in line of sight contact with the GBS transmitters for some 40 - 50 miles of powered flight path while they are still below the ionosphere which is subject to disturbances caused by other nuclear detonations. The whole GBS complex would be turned on only as needed after NAVSTAR is destroyed. With many transmitters it is thus highly invulnerable as a system. Its estimated cost is less than one percent of the overall system cost of SUM (or of the racetrack).

4. Couldn't the Soviets use radar satellites to determine the location of SUM submarines by watching for their snorkels, and by this method locate all the submarines simultaneously or locate the SUM patrol areas over a period of years?

No. The SUM boats are powered by fuel cells so that they will not need to snorkel at any time during their tour of duty of approximately three weeks duration.

5. In Polaris submarines, the missiles are propelled upward through the water, but in SUM, the canisters bob to the surface and are launched at that time. What confidence could we have in launching SUM missiles through heavy seas?

This launch technique has been tested and demonstrated in Project Hydra in the early 1960' s. There should be no difficulty in launching SUM missiles in normal or rough seas due to the very large moment of inertia of the approximately 90 foot long capsules. The practical limits of launching through very heavy seas would be explored during a full development program.

6. Doesn' t SUM lose much of its advantage when it is driven off the continental shelf by the Van Dorn effect? For example, SUM advocates have argued that bottom-mounted communications terminals could be used; SUM submarines could plug into them and unwind a fiber optics cable that would let shore stations communicate with them at will. Would that means of communication be feasible in the deep ocean?

No. SUM has not been driven off the continental shelf by the Van Dorn effect. The proposed basing,from the start, envisaged a deployment area that is roughly two hundred miles wide in order to provide a large enough ocean operating area that couldn' t be barraged by the total Soviet megatonnage. Thus at most 20 percent would have been on the continental shelf off the East coast- and this percentage can be reduced to zero by displacing the East coast deployment further off shore by as much as 100 miles which has no significant effect on the basing concept. In particular, as described in my formal statement, the command and control chain, the guidance procedures and the invulnerability to ASW are not significantly impacted. As to the use of bottom mounted communication terminals, one has in mind here plugging in the SUM submarines via fiber optics to submerged buoys which could be implanted in deep water as well as shallow water. A simpler concept using a disposable awash buoy system is described in my testimony.

7. What advantages could we obtain by deploying SUMs rather than Poseidon or Trident type submarines?

See the answer to question 2 above. The main advantage to SUM lies in the added diversity it provides for the U. S. deterrent. As I stated in my letter of April 11, 1980 to Congressman Seiberling, which has been submitted for the record of these hearings, further analysis is still needed of the operational importance and significance of the major differences between SUM and Poseidon/Trident.

## SUBCOMMITTEE RECESS

Senator LAXALT. Thank you. The subcommittee will stand in recess subject to the call of the Chair.

[Whereupon, at 12 noon Wednesday, May 7, the subcommittee was recessed to reconvene at the call of the Chair.]

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